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THE FOUNDRY TRADE JOURNAL IS THE OFFICIAL ORGAN OF THE INSTITUTION OF BRITISH FOUNDRYMEN AND THE WELSH ENGINEERS' AND FOUNDERS' ASSOCIATION.

Institution of British Foundrymen.
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Secretary: E. J. Griffiths, 20, Fisher Street, Swansea.

The Foundry Exhibition.

Much space is devoted in this number to a description of the exhibits. One of the objects of this is to give those foundrymen who are unable to attend a detailed idea of the ground covered, so that they will at least be aware of the latest innovations and will be able to make themselves familiar with them by applying direct to the exhibitors for further details. Another object is to enable intending visitors to decide beforehand exactly which stands they *must* see, and not as often happens, return home having missed something which is of outstanding interest for them.

A careful perusal of the description of these exhibits will convince all foundrymen that amongst them there is something which will increase his output, improve his product, or lighten the burden of the worker.

Representatives of both the commercial and editorial departments of THE FOUNDRY TRADE JOURNAL will be in attendance at our cottage (Stand Nos. 57 and 58), which both advertisers and subscribers are invited to use as a rendezvous, ample accommodation being provided for this purpose. We only ask that those availing themselves of this offer will be sufficiently kind to sign the visitors' book.

The Birmingham Convention.

According to recent advices the industrial dispute at present existing in the foundry world is likely to be adjusted in the near future in common with those operating in the engineering trades. The result of this is that now there is less uncertainty in the trade there will be a greater influx of visitors to Birmingham, as it transpires many were unable to decide owing to the unsettled conditions. As pointed out in a letter from Mr. T. Vickers, the Conference honorary secretary, which we published last week, no further application can be entertained for tickets for the social events of the Congress. Though the Institution of British Foundrymen mainly occupies itself with the vagaries of cast iron, it seems rather a pity that these unfortunate victims of circumstances should suffer from the "cast-iron" nature of the organisation established for the promotion and carrying out of the Conference. Praise has been bestowed on all sides as to the excellency of the organisation evolved under the capable leadership of Mr. Vickers, but the late-comers express some surprise that it is incapable of expansion at the last minute. However, social aspects apart, the Conference is well worth attending from purely the practical, technical and academic aspects. From correspondence we gather that it is the inability to take part in the visits to works which the late-comers so much regret—the "busman's holiday" evidently being the most popular type with foundrymen. If this is the case, we make on their behalf an appeal to Mr. Vickers and his committee to approach our hosts with a view of asking them to extend further their appreciated kindness in throwing open their works to the visitors.

French Foundry Exhibition, 1923.

At a meeting of the Association Technique de Fonderie de France held in Paris on April 27, it was decided to hold an exhibition in Paris in 1923 at a time still to be decided. With this will be associated a Conference of Foundrymen. Mons. Leonard, the President of the Belgian Foundrymen's Association, agreed to this and announced that his society did not propose holding a Congress before 1924. It is expected that M. Ronceray will advise the Institution of British Foundrymen of these decisions at the Birmingham Conference. Last week we advocated editorially that a cycle of this nature should be arranged.

MESSRS. LAWSON, WALTON & COMPANY, LIMITED, of 2, St. Nicholas' Buildings, Newcastle-on-Tyne, have been appointed the Northern representatives of the Constructional Engineering Company, Limited, the Adaptable Moulding Machine Company, Limited, and Messrs. Quick, Barton & Company, Limited.

XUM

The International Foundry Exhibition.

To-day sees the opening of the first exhibition, solely devoted to the requirements and output of the foundry industry, ever held in Great Britain. The exhibits which we describe below are of a very comprehensive character, and we are pleased to note that the two main essentials of foundry practice—moulding machines and cupolas—are particularly well represented. Refractories—a subject of the highest importance for all foundrymen—has received a good deal of attention, and these, in conjunction with core oils, will attract many foundrymen. Whilst the major portion of the exhibition is devoted to the requirements of the foundry, there are several stands exhibiting finished castings, and these, no doubt, will come in for critical examination by the visitors. Pattern-makers will find much to interest them in the woodworking machinery section, and in a novel paste which can be used for making fillets. The model foundry is bound to receive much criticism, as every foundry manager has his own ideas as to how this should be laid out; but they should remember that those responsible have been limited by space, and the work of any sub-committee can only be a compromise at best. From a perusal of the description of the stands, it will be seen that every section of equipment is shown—ladles, automatic riddles, pattern plates, core-making machines, core-sand mixers, and a representative selection of the smaller tackle daily handled by moulders. The fettling department, which is quite often more neglected than the foundry proper, is catered for by exhibits of sand blasting machinery, tumbling barrels, saws, and grinding machinery. Finally, there are other exhibits to help with the general organisation of the department.

Visitors are reminded that, in addition, some space has been allocated to the history of the foundry, where some antique castings are being shown. The aim of the section has been to put forward the artistic side of the craft and to interest the modern foundryman in an aspect of his work which is becoming more and more restricted.

CROSSLEY BROTHERS, LIMITED.

The most interesting feature of this firm's exhibit is an open-hearth gas plant, having a capacity of 5,000 cub. ft. per hour; additionally there are "Docking" patent gas and air compressors of similar capacity, and a number of furnaces for case-hardening, metal-melting, heating of soldering irons, blow-pipes, etc. The whole of the plant will be in actual use, and the British Cast-Iron Research Association, whose stand adjoins, will make use, in their model foundry, of the metal melted.

The gas produced has a value of 130-140 B.T.U.'s per cub. ft., and will be thoroughly cleansed of all its impurities by passing through a suitable scrubber and purifier. The gas is then dealt with by the gas and air incorporator, which thoroughly mixes the gas and air in definite proportions and delivers it to the furnace at a pressure of 80 in. water gauge. The burners used on the furnace will be of the well-known orifice type, with multiple nipples.

The Docking system has been fully described in our issues of December 8 and 15, 1921.

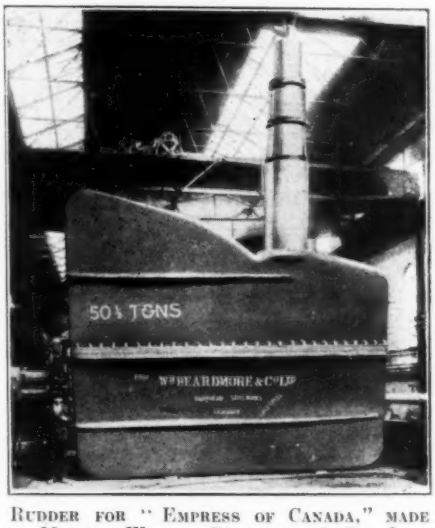
BROOKES (OLDBURY), LIMITED.

The exhibits of this firm, who are pattern-makers for the trade, are naturally restricted, and they only show a few typical examples of their work. These include wood patterns for pumps, machine tools, electrical work, etc., etc. From the metal department they are exhibiting many loose patterns and a large assortment of pattern plates.

An interesting section is devoted to a new aluminium snap-flask, shown in various sizes, and patent adjustable aluminium moulding boxes. The smallest size of this class can be adjusted both ways to any size between the maximum, 16 in. by 14 in., and the minimum, 12 in. by 10 in. This will supply a long-felt need in the foundry, where the cost of moulding boxes has always been a serious problem.

Messrs. WILLIAM BEARDMORE & CO., LTD., Parkhead, Glasgow and Mossend, Lanarkshire.

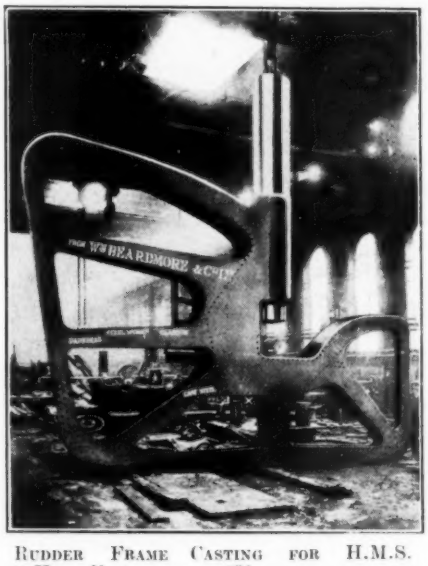
This firm, which supplied over 1,100,000 tons of steel during the war, are, unfortunately, precluded by the immense size of casting in which this firm specialises from showing actual specimens of their work; the capacity of the Parkhead foundry, for instance, is such that single pieces of 110 tons can be cast. To give some idea of the nature of their work, the firm is having recourse



RUDDER FOR "EMPRESS OF CANADA," MADE BY MESSRS. WILLIAM BEARDMORE & CO., LTD.

to scale models in wood, measuring approximately one-quarter of the actual size.

These may not be very impressive to the general public, but to the engineer they will give an excellent idea of the size and intricacy of the work undertaken at the Parkhead and Mossend establishments, which were amongst the first steelworks in Great Britain, and have always kept abreast of the times in equipment and organisation.



RUDDER FRAME CASTING FOR H.M.S. "HOOD" WEIGHING 50½ TONS, MADE BY MESSRS. WILLIAM BEARDMORE & CO., LTD.

Lighter castings, such as for locomotive work, form another branch of activity in both foundries, and samples of these are being exhibited on the stand.

In mentioning the Beardmore exhibits, perhaps first place should be given to heavy marine castings, situated in the great shipbuilding area of the Clyde, and being themselves extensively involved in large-scale ship construction.

Messrs. William Beardmore have done a great deal of this work. They have supplied the largest castings and forgings for many famous vessels, notably (in recent years) H.M.S. "Hood" and the "Empress of Canada," the largest liner in the Pacific. Models of the "Hood's" rudder frame, which weighed 50 tons, and of the liner's complete rudder (50½ tons) are shown and illustrated above.

Three other marine castings are shown (in model): A single shaft bracket for H.M.S. "Repulse" (40 tons), the sternpost for a single-screw vessel (20 tons), and a double shaft bracket for a twin-screw vessel (15½ tons).

The increasing size and weight of heavy-duty electrical machines has made corresponding demands on the skill and capacity of modern British foundries, and Messrs. William Beardmore have contributed some of the finest specimens of steel casting in this department. Two models are staged of castings made to the order of the British Thomson-Houston Company, Limited, one a fly-wheel weighing 31½ tons, the other a "spider" casting (19 tons) for the armature of the same machine.

The manufacture of steelworks plant is another department of heavy engineering in which the craft of the moulder plays an important part. The Beardmore foundries have been called upon to cast several enormous pieces for specialists in steelworks machinery, such as Duncan Stewart & Company, Limited. Two of these are shown—the cross-head for a 6,000-ton press, comparatively small in size but weighing 51½ tons, and one of the roll-housings for a steel rolling mill, 42 tons.

Unusually good views of the works are hung round the stand, together with photographs of finished manufactures by the same firm, such as warships, ocean liners, railway locomotives, air-ships and aeroplanes, and motor cars.

THE CONSETT IRON CO., LTD., Consett, Co. Durham.

This firm are exhibiting various grades of Hematite pig iron, including a special low-silicon pig suitable for chilled castings, and castings made from such iron showing depths of chill varying with rate of cooling.

Two grades of foundry coke are shown; one is the original Garesfield and the other Consett patent by-product.

Coke nuts for gas producers, smithies, central heating, greenhouses, etc., are also shown.

Silica bricks form an important exhibit. These are specially manufactured for use in steel works, gas works, ore briquetting plants, foundries, coke ovens, and other places where a high refractory material is required. The firm make a speciality of difficult shapes.

Of firebricks, three brands are shown, the "M. Bute," "Bute," and "Delves." These bricks are largely used by the most important iron and steel works in the North of England.

No stand of Messrs. Consett would be complete without steel sections and plates, and these occupy an important part of the exhibits shown.

W. NICHOLSON & CLIPPER CO., LTD., King Street, Salford, Manchester.

The business of this firm is mainly that of belt fasteners and tools, and they are showing the "Klincha" system of belt lacing, which enables a joint to be made on a 3 in. belt in one minute. Belts jointed with "Klincha" fasteners are flexible and interchangeable, and will run smoothly round the smallest pulley without any noise.

The "Clipper-Klincha" lever belt lacing machine is intended for large users of belting; the "Klincha" machines for ordinary work, and the "Baby-Klincha" tools are for small users of belting. The "Jumbo-Klincha" belt lacing tool and fasteners are specially designed to suit heavy drives.

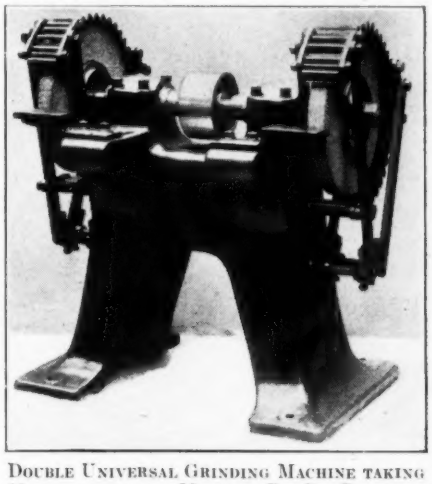
The "Python" file and tool handle, also shown, has a steel coil spring pressed into the centre, which is secured in its place by a special ferrule. These two together take up all the pressure when the file is driven into the handle. The ferrule is so fixed that it cannot be removed without destroying the handle. The handle grips the file tang much firmer than the ordinary handle, because the wood is compressed in the coil spring when the file is driven in.

B. R. ROWLAND & CO., LTD., Stockport.

This exhibit has special interest for the fettling shops. Outstanding amongst these are two Universal grinding machines, the lighter one, Type B, taking 16 to 18 in. dia. wheels, and the heavier, Type D, 30 to 42 in. dia.

Photographs of a large number of other machines which the firm make for grinding special work are also shown.

Vitrified Wheels.—As actual manufacturers of this class of wheel they show a large range of Vitrite carborundum and Vitrite corundum wheels, manufactured specially for use in both iron and steel foundries.



DOUBLE UNIVERSAL GRINDING MACHINE TAKING 18 IN. WHEELS.—MESSRS. B. R. ROWLAND & CO., LTD.

Elastic Wheels.—Samples of this class of wheel which are particularly useful and serviceable for many classes of foundry work are also exhibited.

They also have on view samples of carborundum scouring blocks and other abrasive specialities which are requisite in all foundries.

Refractory Tiles and Bricks.—These tiles and bricks have been specially made to overcome the difficulties now experienced with fire-bricks and tiles as used in muffle and other types of furnaces, where very high temperatures are required. One of the special features of these bricks is the high thermal conductivity, being seven times as great as that of ordinary fire-brick. Various samples of these specialities will be shown.

THE FOYT METAL COMPANY OF GREAT BRITAIN, LIMITED, Deodar Road, Putney, London, S.W.15.

This exhibit includes a range of standard brands of ingot anti-friction (white) metals, graded to meet every engineering requirement.

Number Eleven alloy is a metal of particular interest to those concerned with the maintenance of Diesel and oil engines; high-speed steam engines; lorry, automobile and aviation engines, etc. Sample bars of this alloy, twisted and hammered cold to demonstrate its exceptional toughness, are shown. Unequalled toughness and durability are the distinctive features of Number Eleven; the former characteristic is valuable and important, rendering it less liable than any other to become cracked in the housing.

I.C.E. ("Internal Combustion Engine")—formerly called "Copper Hardened"—is another well-known brand marketed by the company, popular among users of heavy and fast-running machinery.

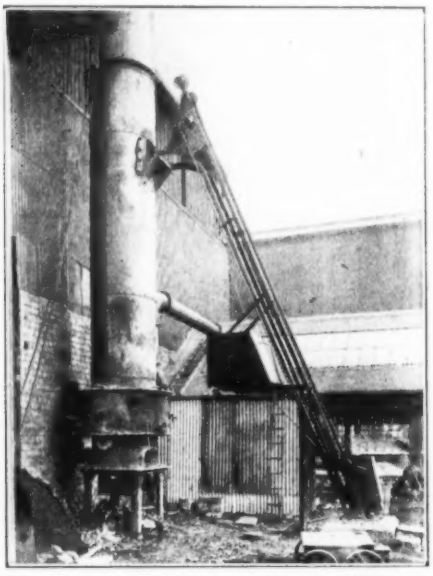
Die-cast bearings (for repetition work) are shown, true to 0.001 in., and ready to fit. These castings, which are in increasing use (for reasons of economy) in the place of bronze, etc., are adaptable to almost all types of machinery. Suggestions and frank advice cheerfully given on sight of drawings.

Besides making antifriction alloys, this firm have laid themselves out for re-metalling bearings for the trade. Bearings of all types are re-metalled in a high-class manner, reasonably, accurately, and quickly.

XUM

THWAITES, LIMITED, Bradford.

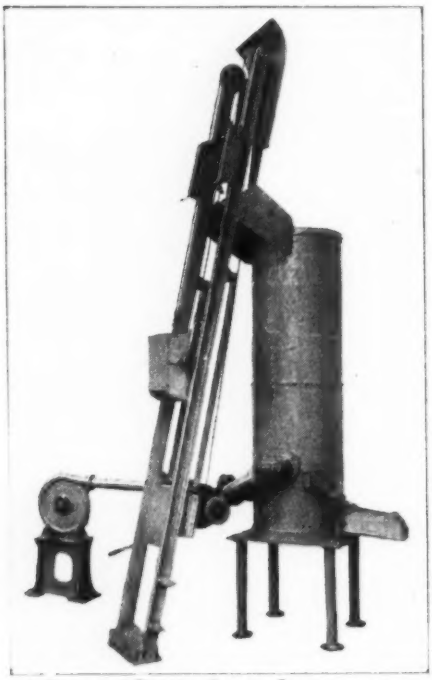
This firm's exhibit is of an extremely varied character and contains much of interest for both ferrous and non-ferrous foundrymen. First of all there is a No. 4 Cupola of the latest Ultra-Rapid design with all mild steel drop bottom. This cupola is fitted with two rows of large tuyeres of special design, the top row being fitted with shut-off valves.



MECHANICALLY OPERATED CUPOLA.—MESSRS. THWAITES, LTD.

The air belt it fitted with dividing plate and separate control valves to each side of the air belt. The cupola will be connected to an electrically operated charging machine and is fitted with a special cast-iron distributing plate for that purpose.

Electrically Operated Charging Machines.—



A COMPLETE DWARF CUPOLA INSTALLATION.—MESSRS. THWAITES, LTD.

This machine is one of their No. 1 size, suitable for a cupola melting 4 tons of iron per hour and is fitted with a patent hoisting gear coupled to a continuously running electric motor. The control is of the very simplest, a single hand lever, the upward movement of which causes the bucket to rise, the downward movement allowing the bucket to descend by gravity. If the hand lever is released it returns to the mid position, and the bucket comes to a standstill at any part of its ascent or descent. An automatic knock-off is fitted at the top of the travel. The machine is being shown at work.

Dwarf Cupola.—Two sizes of Dwarf cupola complete with high speed positive blowers and piping are shown, the melting capacities of which are 20 and 10 cwts. per hour respectively. The larger cupola is fitted with a hand operated charging machine fitted with our patent hoisting gear. This gear has two speeds, one for raising iron charges and one for coke, and the lowering of the bucket is carried out by gravity under the control of a brake lever. A feature of great value is that the crank handle never runs backwards during the lowering, so that it is not necessary to remove the handle from its shaft. The gear is so arranged that should the crank handle be released at any point of the lift the bucket will remain suspended. The smaller cupola is fitted with a small charging stage.

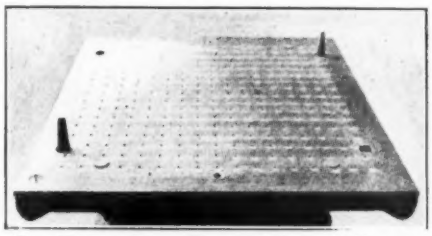
Portable Elevator.—This machine is one of a type of portable elevator which we manufacture for use in foundries, contractors' yards, railway sidings, docks, etc., and can be used for loading a variety of loose materials into trucks or carts. Amongst other plant which is of outstanding interest for foundrymen are "Bradford" sand mixers, 10 cwt. hand jib crane, high speed positive blowers on roller bearings, etc., vacuum cleaning plant and core making machines.

Steel Castings and Micro-Photographs.—A number of exhibits of steel castings of a miscellaneous order are shown, detailing the class of work made in their steel foundry and also some very interesting specimens of steel and micro-photographs in great variety.

JOHN MACDONALD & SON, Maryhill, Glasgow.

This exhibit consists of a petrol-driven air compressor of entirely unique design, the main constructional feature being that the motor and compressor cylinders are cast in a single block, and although the compressor has a piston displacement capacity of 74 cub. ft., the whole set weighs only 880 lbs. The compressor will drive one of the "Ajax" pneumatic jolt-ram turnover and pattern drawing moulding machines of the firm's latest design, and also an "Ajax" plain jar-ramming machine.

The "Ajax" turnover machine can not only draw the pattern away from the mould, but if desired, can draw the mould from the pattern; this is a feature which will appeal to foundrymen. The "Ajax" moulding machine will not cause ground disturbances detrimental to moulds in other parts of the foundry, or damage surrounding walls.



THE PLATE FOR A VICKERS PATENT PATTERN DRAWING MACHINE.—MESSRS. JOHN MACDONALD & SON, LTD.

Pneumatic and electric sand-shakers, pneumatic tools and accessories, and a pneumatic hoist is also shown, along with a "Cupolette" of 10 cwts. per hour melting capacity, and a selection of foundry ladles and mountings, and pressed steel moulding boxes.

The Vickers Patent pattern drawing machine will prove of interest to most foundrymen, as it provides a means whereby one plate of the maximum capacity of the machine will suffice. This plate is universally adaptable to a single or any number of patterns of any form and ensures interchangeability between the pattern shop and the foundry. It is unique in that it permits of the whole area of the plate being covered with a variety of different patterns with the certainty that both half moulds will exactly coincide at the junction. The patterns, being loose, entail no extra cost of production and in the ordinary way could be moulded by hand.

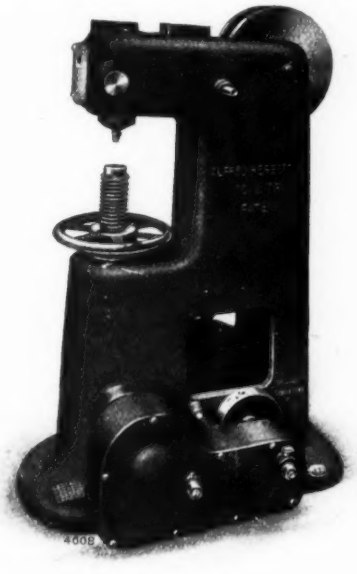
ALFRED HERBERT, LTD., Coventry.

This concern are exhibiting their No. 2 sand-mixing machine, two types of Brinell hardness testing machines, one of which is power driven, and the other designed for ascertaining the hardness of thin sections; Norton floor grinder, with Norton wheels; castings in both iron and bronze; and "Korex" core-making compound.

"Korex" Core Making Compound.

This material is made by Currie & Hutchinson, of Gateshead-on-Tyne, who claim that (1) it has a greater binding strength than any competitor; (2) it makes cores which prove to be hard and firm, with a fine and smooth surface; (3) it is essential in the best production of "thin" cores for motor cylinders, for example; (4) it gives beautifully clean castings, with consequent considerable saving in labour costs; (5) it goes with either "open" or "close" sands, will not "crust" or "creep"; runs uniform in strength and quality; does not stick; eliminates the tendency to "blow."

This mixture was given a thorough trial in our foundries on different kinds of cores. It was found that not only was it more economical than previous compounds used, but it dried much quicker and more uniformly, and showed not the slightest inclination for the water to separate and fall to the bottom of the core. It was also found that the bonding was stronger than previously obtained, and test bars made and broken transversely showed the "Korex" mixture to be fully twice as strong. It also leaves the corebox cleaner, and what residue there is left behind is much more



A BRINELL HARDNESS TESTING MACHINE.—MESSRS. ALFRED HERBERT, LTD., COVENTRY.

easily removed. It is much more pleasant to handle, particularly with regard to the smell; also, the core before drying is stronger and not so liable to sag when the core is of irregular section.

Sample cores made with this compound, together with some samples of the compound itself, are included in the exhibit.

Messrs. Alfred Herbert, Limited, have been appointed sole selling agents for this compound in Great Britain, Ireland, and Japan.

Sand-Mixing Machines.

The machines exhibited were originally designed by the concern for use in their foundry after unsuccessful efforts to obtain efficiently mixed sand from other types of machines. With previous machines a great deal of the new sand never reached the moulding floor, as, owing to the imperfect mixing action, it remained in lumps coated with old sand and coal dust, and was retained by the riddle, thus causing loss and waste. With these machines all lumps are crushed and the sand riddles much more easily, thus saving a great deal of time in moulding. A great economy also results from the fact that the sand does not need to be milled before mixing.

The machines consist of a pedestal carrying two vertical spindles rotating at a high speed, one within the other. The spindles are driven in opposite directions by bevel gearing from a pulley on a horizontal shaft. The upper ends of the spindles carry two intermoving cages, the bars of which, passing each other in opposite directions at a great speed, do the mixing and disintegrating. The cages are covered by a dome-shaped casing which directs the mixed sand on to the floor and prevents it from flying about.

The centre of the dome carries a hopper, into which the unmixed sand is fed, and from which it drops into the centre of the cages. The hopper can be lifted off for the purpose of cleaning and for removing hard matter which may be caught by the bars. Sand that contains stones or pieces of iron should be screened before coming to the mixing machine.

Small Ball Hardness Testing Machine (Craig, Moore & Mather's Patent).

This machine is the outcome of investigations made in the Research Department, Woolwich, with the object of evolving a means for determining accurately the hardness of thin specimens.

The Brinell test as usually applied with a ball of 10 or 5 millimetres diameter and a load of 500 to 3,000 kilograms, is unsuitable for thin specimens.

With a 10 millimetres ball, the specimen should not be less than one-tenth of an inch in thickness. With the "small ball" machine, however, the hardness of material one-hundredth of an inch or even less in thickness may be determined accurately.

Such articles as thin-walled tubes and other hollow forms may be tested without internal support; loaded small-arm cartridge cases may be tested without removal of the bullet or charge; cutlery blades, which would be disfigured by a large impression, even if the thickness of the article would permit of the ordinary test, may be tested by an impression so small as to be imperceptible to the unaided eye; the hardness of wire can be tested at successive stages of drawing; case-hardened work, the hard skin of which is too thin to be tested by the ordinary Brinell method, can be quite successfully dealt with; the hardness of a cutting tool may be determined close to the cutting edge, the impression produced being so small that the tool is not damaged or affected in any way; tests may also be made on very small areas of larger objects in which the hardness may vary in different parts.

Patent Power-operated Hardness Testing Machine.

This machine consists of two elements—a weighing element and a straining element.

The ball is carried by a vertically moving plunger, the weight of which is neutralised by a light spring. This plunger moves upwards a small amount when the specimen to be tested is raised into contact with the ball, the pressure between the specimen and the ball being weighed by a pair of compound levers and a weight which becomes poised when the full pressure is reached. The fulcrum of the first lever consists of a pair of ball bearings and the other end of the lever is a circular arc with spur teeth cut in it. The other lever is a lever in effect although perhaps not in form, as it takes the shape of a pair of pulleys or sheaves with a pinion keyed between them. The pinion engages with the teeth of the first lever. The two sheaves and pinion are mounted on ball bearings. A wire cord passes round the two sheaves to which its two ends are anchored, and also round a third sheave attached to an adjustable weight inside the column. The six loose weights are required for the 3,000 kg. load, but must all be removed for the 500 kg. load.

An indicator situated at the front of the machine shows when the weight is poised and the full load consequently on the specimen.

The object to be tested is placed upon a flat anvil or pressure plate resting on a spherical seat on the top of a vertical screw which can be elevated by a hand wheel to bring the work into contact with the ball. The spherical seat has a recess in the centre so that a Vee block or any special form

of support required for cylindrical or other work may have a projection which will locate it without risk of slipping.

The screw occupies an axial position in a vertically moving cylindrical ram. The lower end of the ram carries a roller which rests on a cam which makes a single rotation for each test.

The cam is formed so as to apply the load gradually, to maintain it for the pre-determined period and then to remove it.

The cam is rotated by a worm wheel and driven by spiral gears from a single pulley near the base of the machine. The motion is engaged by depressing a pedal and is automatically disengaged at the end of one revolution of the cam.

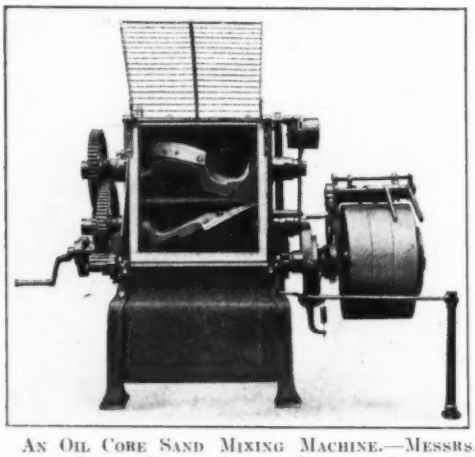
An efficient measuring microscope has been designed for use with the machine.

JOSEPH BAKER, SONS & PERKINS, LTD., Engineers, This firm are showing the "Universal" loam, oil-sand and core-sand hixer. The chief advantages claimed by the makers of this machine are:—

(1) Perfect incorporating action.—This is attained by two scientifically-designed mixing blades revolving at different speeds (in contrary directions), placed horizontally in a containing trough, the bottom of which is formed into two semi-cylinders.

(2) Great durability.—The trough is lined with renewable cast-iron plates, and the blades are protected with renewable and adjustable cast-iron sheaths, so that wear caused by attrition does not affect the actual machine itself.

(3) Minimum of space occupied—This is much less than for edge runners.



AN OIL CORE SAND MIXING MACHINE.—MESSRS. JOSEPH BAKER, SONS & PERKINS, LTD.

(4) Convenience of discharge.—The trough tilt-mounted at such a height that the materials (sand, oil, manure, etc.) can be easily fed—by shovel or otherwise—into it.

(5) Convenience of discharge. The trough tilts and the charge is tipped straight into a truck.

(6) Substantial construction.—The machine is carefully constructed of iron and steel, every precaution being taken to prevent undue wear. In addition to the protecting sheaths and plates—already referred to—the mixing-blade axles are provided with specially-designed stuffing boxes, so that the mixture cannot work its way out through the trough sides and into the blade bearings.

(7) Large output.—Mixings are completed in from three to ten minutes according to the materials contained in them.

(8) Small power consumption.—The power required is much less than that used by edge runners.

(9) Ease of cleaning.—All parts are readily accessible.

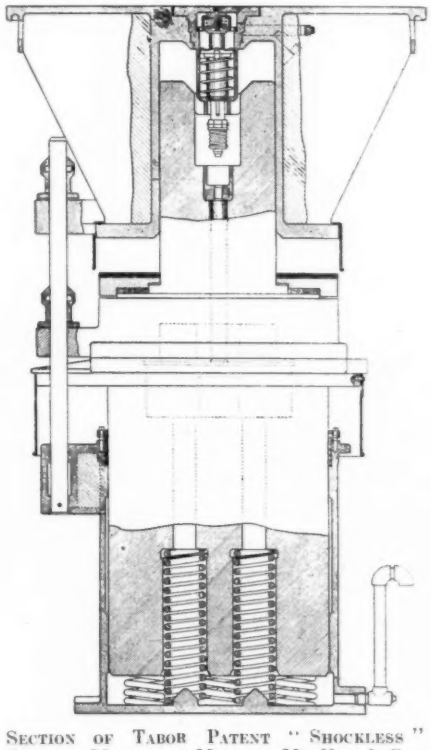
A test was made recently of a size 14 "Universal" core sand mixer, the mixture being composed of five parts of red sand, two parts black sand, and one part manure. After running for ten minutes the mixture was homogeneous, porous, cohesive and uniform in colour and texture. The power taken for the mixing (two barrow loads) was 6 h.p., the units absorbed being .756.

MACNAB & CO., LTD., 56-58, Eagle St., Southampton Row, London, W.C.1.

Messrs. Macnab and Company exhibit several types of their well-known Tabor moulding machines and Tylor crucible furnaces. Tabor moulding machines are operated by compressed air, and their salient features are the freedom from ground shock during the jarring operations and the speed at which they operate, enabling production to be increased up to forty times that given by the old hand methods. The "Shockless" jarring feature is of supreme importance in all foundries; as no shock or vibration is transmitted to the foundations or surrounding ground, moulds can be made and cores set adjacent to the machine whilst the machine is in operation. This applies to all sizes of boxes from 450 lbs. up to 35,000 lbs. weight. All machines have been designed with full consideration of modern foundry conditions and also to make each type as wide in its application as possible without prejudice to its output and efficiency. All valves are enclosed in the centre of the machine, and are therefore immune from grit, sand, etc., and the oiling is automatic.

Five distinct types of machines are exhibited, of which the following is a brief description:—

"Universal" Jar Ramming and Pattern Drawing Machine.—This machine is manufactured in



SECTION OF TABOR PATENT "SHOCKLESS" JARRING MACHINE.—MESSRS. MACNAB & CO., LTD.

five different sizes to handle boxes of from 3,000 up to 35,000 lbs. Boxes of these capacities can be "shocklessly" jar rammed, rolled whilst transferring the mould from the jarring to pattern vibrating and drawn in less than five minutes. The size of the boxes may be any size within reasonable limits. The machine is controlled by a patented valve which makes it possible for the machine to be operated by anyone unskilled, and is as near "foolproof" as possible. These machines can be used for all classes of work.

Portable "Shockless" Jar Ramming Roll-Over Machines.—These machines are made in two sizes to handle boxes of 450 lbs. and 800 lbs. weight of sand, pattern and box. They are suitable for all types of moulds up to 8 in. and 10 in. pattern draft respectively. These machines are entirely self-contained and will "shocklessly" jar-ram, roll-over, vibrate, draw pattern and roll-back the pattern ready for the next box, the total time taken for these operations is three minutes. They are quite portable, being mounted on wheels.

Power Squeezing "Split Pattern" Moulding Machine.—This machine is particularly adapted for

making moulds from symmetrical patterns, split through the centre, or flat back work, but any pattern that can be split on a true plane can be moulded. The boxes are squeezed to a definite pressure by a cylinder thrusting against an overhead yoke. The pattern is then automatically vibrated and withdrawn by a specially controlled cylinder acting upon a skeleton frame supporting the box, the total time required for making a complete half mould being less than 40 seconds. This machine is made in 15 different sizes.

Power Squeezing Moulding Machines.—This machine is specially suitable for light snap-flask work, and is for boxes up to and including 14 in. by 20 in., or the equivalent in area at 80 lbs. air pressure. The sand in the boxes is squeezed to a proper density between a cylinder head and an overhead yoke. The machine is complete with a vibrator frame for vibrating the pattern whilst it is being drawn, and can also be used with aluminium match pattern-plates. It is very fast, and can show 20 to 30 per cent. increase over hand squeezing machines.

Jar Ramming and Stripping Machine.—This machine is designed for dealing with stripping plate work with boxes of 12 in. by 12 in. up to 12 in. by 18 in. with a 10 in. pattern draw. The jarring cylinder is constituted exactly as their ordinary jarring machines. The pattern draw mechanism is also operated by a piston in this cylinder. The machine is self-contained and requires no foundation. Two types of plain jarring machines suitable for bench work are also exhibited.

Tylor Crucible Furnaces.—Two types of these furnaces are exhibited, the 200 lb. bit type and 400 lb. tilting type. These furnaces are eminently suitable for melting all non-ferrous metals.

W. T. AVERY, LIMITED.

Foundrymen will find much of interest in this exhibit, which comprises a varied selection of modern weighing, testing, counting machines and fine balances. Their exhibit No. 830 is a crane weigher, of 5 tons capacity, laboratory designed, for weighing castings, ladles, boilers, etc., whilst suspended from crane. Exhibit No. 624 is a foundry bar-testing machine for making transverse tests on cast-iron bars, constructed of iron and steel throughout, with hardened knife-edges and bearings. It is provided with a machine-cut straining screw and gunmetal adjustable extension and deflection scale. The poise is screw-propelled through bevel-wheel gearing and two spur wheels, whose pitch circles intersect exactly on the fulcrum knife-edge. This arrangement prevents any pressure of the hand being transmitted to the steelyard during a test.

One naturally associated with the name of Avery weighing machines, and a good selection is being shown, including counter scales, chemical laboratory balances, dormant counting and weighing machines.

Exhibit No. 282 is a platform machine of 10 cwt. capacity. The platform is 2 ft. x 2 ft. 6 in. with semi-automatic indicator, the legs of which are designed so that when placed on the levers they seat themselves immediately in the correct position, giving accurate alignment to the knives and bearings. Fitted with hardened steel knives, the steelyard has a "Delta" metal index bar associated with it, and is notched and marked by an automatic machine designed for the purpose.

A special feature of the poise is that lead shot for adjusting the weight can be added or subtracted without disturbing the equilibrium of the steelyard. A cast-iron tumbler is fitted to the carrier, which securely locks the steelyard when the machine is being moved or is otherwise out of use. This locking device dispenses with the old type of handle gear, which tended to wear the knives when thrown in and out of action. Fitted on the tail-end of the steelyard, the balance box is divided into two compartments, one containing a horizontal balance ball for obtaining correct balance of the machine, and the other containing a vertical balance ball which corrects the vibration or acceleration of the steelyard as desired. All bearings are self-aligning and interchangeable.

TRANSVERSE BAR TESTING MACHINE.—MESSRS. W. T. AVERY, LTD.

ATLAS PRESERVATIVE CO., LTD., Deptford, London, S.E.8. Agents—Messrs. James Turnbull & Co., 3, New Street, Birmingham.

This firm are showing specimens treated with "Atlas Ruskilla," an iron and steel paint, the base of which is a mineral with an action which renders it possible to paint directly over the rust with satisfactory results.

"Atlas Ruskilla" is extremely resistive to acid gases, temperature variation, and adverse atmospheric influences. It is thoroughly durable, does not crack or peel under strain or vibration, is quick-drying, and has a covering power of 700/900 sq. ft. per gall. Colours can be applied over "Ruskilla" if the coated surfaces are treated with "Atlas" primer.

Other specimens relating to "Atlas E" boiler preservative—an efficient method of eliminating and preventing corrosion in boilers—and to "Atlas A" wood preservative—which hardens and strengthens all classes of timber, prevents attack by white ants, borer beetle, and the like—are also shown. It prevents fungoidal growth, "dry" and "wet" rot, and fireproofs in the ratio of 4 to 1 compared with untreated timber.

WILLIAM CUMMING & CO., LTD. Head Office and Works: Maryhill, Glasgow. Also at Falkirk, Middlesbrough, Chesterfield and Deepfields.

Being large and direct importers of plumbago, it is only natural that this mineral should take a prominent place on the stand, and various grades are shown mostly in process of clarification and manufacture.

It is stated that altogether over forty different grades of facings are manufactured, and a large proportion of these are being exhibited, including heavy, medium, and light blackings, various grades of patent, including several of the firm's registered qualities, charcoal, mineral and common.

The steel foundry is also catered for and samples of composition, steel paint, and silica paint are all shown, together with various grades of core gum, both dry and liquid.

The firm make a speciality of various foundry requisites, and founders generally will be interested in the show of straw ropes, chaplets, brushes, box hooks and eyes, nails, and various other foundry requirements.

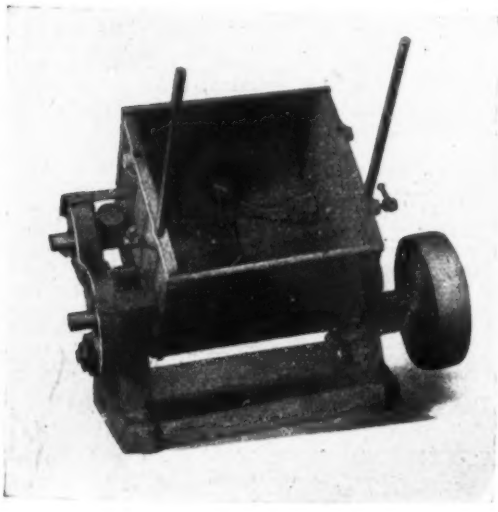
The grists of the various facings clearly show the fineness of the grinding necessary for the reduction of refractory materials of this character.

THE UNIVERSAL SYSTEM OF MACHINE MOULDING AND MACHINERY CO., LTD.
97, Queen Victoria Street.

The concern is the London house of Messrs. Bonvillain & Ronceray, of Paris. Amongst the machines exhibited are:—

E.R. 3. Hydraulic roll-over moulding machines.—This machine is a recent design, and is used for deep sections of moulds. The machine is rolled over by hydraulic power.

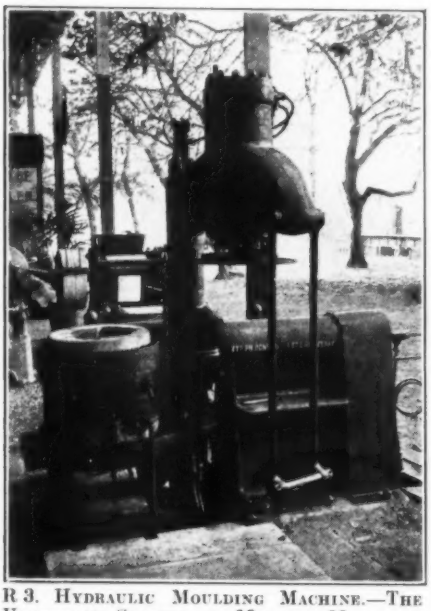
E. 3. Standard moulding machine.—This is a



AN OIL SAND MIXER. THE UNIVERSAL SYSTEM OF MACHINE MOULDING AND MACHINERY CO., LTD.

new type of machine, and is worked by hydraulic power, the table of the machine containing the pattern plate being pushed up against the pressure plate.

S.A. 3. Assembling machine.—This machine is a patented hydraulic assembling and pushing-out machine, and has a very interesting tool case. It not only ensures the accurate closing of the mould



R 3. HYDRAULIC MOULDING MACHINE.—THE UNIVERSAL SYSTEM OF MACHINE MOULDING & MACHINERY CO., LTD.

with unskilled labour, but pushes the mould completely through the box, enabling castings to be made without boxes. Moulds up to about 24 in. in diameter, or 24 in. square, or oval, can be treated in this interesting manner.

J.H. 3. Hydraulic jolt-ramming machine.—This apparatus is really the result of experiments which have been carried out in France. This is the first time that a jolt-ramming machine worked by hydraulic power has been exhibited in Great Britain. One of the greatest troubles with the compressed-air jolt-ramming machine has been the cost of producing compressed air, and the tremendous leakage in the pipe lines. This concern has succeeded in making a hydraulic jolt-ramming machine, a very large number of which can be worked with a 5-h.p. motor.

Horizontal pump and hydraulic accumulator.—This plant has been installed upon their stand for the purpose of working the moulding machines.

D.F. 4. Hydraulic moulding machine.—This type is now familiar to most British foundrymen, large numbers having been sold. The outstanding feature is the speed of production. It is quite possible on a simple mould to make with two youths 400 complete moulds in eight hours, working without tiring the men; the machine doing the majority of the work. This machine rams the top and bottom moulds in one operation, withdraws the pattern plate, closes the box on the machine, and then pushes the mould completely through the box, enabling the casting to be made without boxes. The size of the mould is 17 in. × 12 in. approximately.

R. 3. Standard hydraulic roll-over machine.—This machine is very similar to the E.R. 3 machine described above, but the reason it is being exhibited is that it is larger than the E.R. 3, and it is particularly desired to show on this machine pattern plates at work, which astonished critics of the squeezer type of machine at the last Liège Exhibition, where a most interesting gear case casting was made on this machine. The same pattern plate is being shown as at Liège.

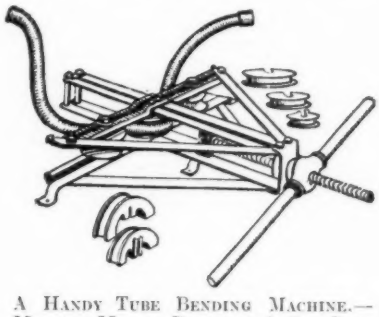
A small oil-sand core mixer is also being shown, and in connection with this a man is in attendance making cores from a special preparation, which at the present time is being placed on the market, which will enable the cores to be dried quickly in the air, eliminating entirely the stove for core work.

This should create much interest amongst foundrymen as the claim that the necessity for drying the cores no longer exists is certainly novel.

The exhibit also includes a large number of finished castings and pattern plates, stripping plates, and core boxes made in metal without machining.

MAJOR, ROBINSON & CO., LTD., Sykes Street, Manchester.

The special feature of this stand is "Scols" iron and steel cements, which have been on the market since 1904. These materials have recently been awarded a diploma and medal by the Royal



A HANDY TUBE BENDING MACHINE.—MESSRS. MAJOR, ROBINSON & CO., LTD.

Sanitary Institute. Other interesting exhibits are "Scols" graphite pipe-joint compound, an elastic coment and a tube-bending machine.

THE NATIONAL TIME RECORDER CO., LTD.

As their name indicates this firm specialises in time recording clocks. They are supplementing their exhibit by showing the products of Messrs. System Equipments, Ltd.

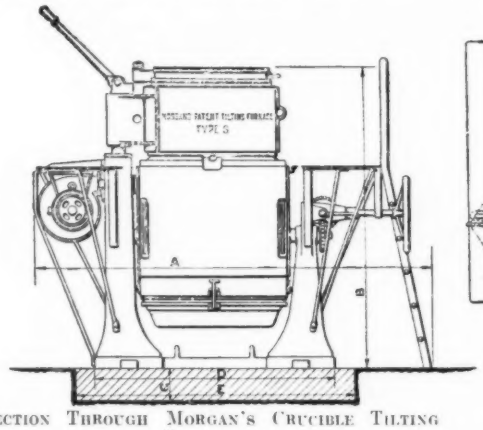
GEO. SALTER & CO., LTD., West Bromwich.

This exhibit is composed of grey-iron castings, for engineering and general purposes, sad irons, tailors irons, box irons, umbrella racks, and also several patterns of spring balances for use in the foundry.

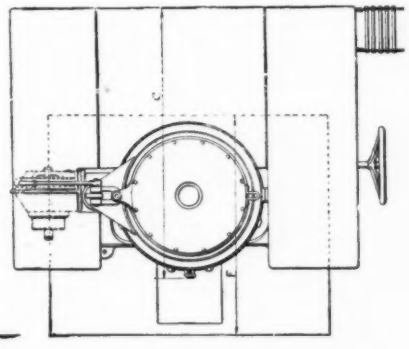
THE MORGAN CRUCIBLE COMPANY, LTD.

Space precludes the exhibition of all grades of Morgan's crucibles, etc., but interesting general pictures of the Morgan Crucible Company's wide range of manufactures are provided by the various groups into which their exhibits have been divided.

The exhibit is divided into two sections.



SECTION THROUGH MORGAN'S CRUCIBLE TILTING FURNACE.



PLAN OF MORGAN'S TILTING FURNACE

Section 'A."—Fuel-Fired Articles.

Crucible Designs are represented by an example of each of the seven standard shapes produced.

Crucible Sizes.—The range of sizes is shown by the "brood" of crucibles formed by a 2,000-lb. crucible surrounded by others having a capacity of only a few ozs.

Crucibles for Purposes other than Melting.—Specimens of retorts, etc., for de-zincing, de-silverising, annealing and brazing point to some foundry uses other than straight forward melting for which Morgan's manufactures are employed.

Results given by Morgan's Crucibles.—Exhibits of used crucibles with the particulars given of their life history will record for users the results they may expect to obtain with proper care and experience.

Rapid Heating Crucibles.—The cost of crucible melting depends on the amount of fuel consumed, the rate of melting, and the life of the crucible.

A new process has rendered it possible for Morgan's to produce a crucible which will melt a given charge of metal in 20 per cent. less time, with 20 per cent. less fuel and 20 per cent. longer life than the standard crucible employed to-day.

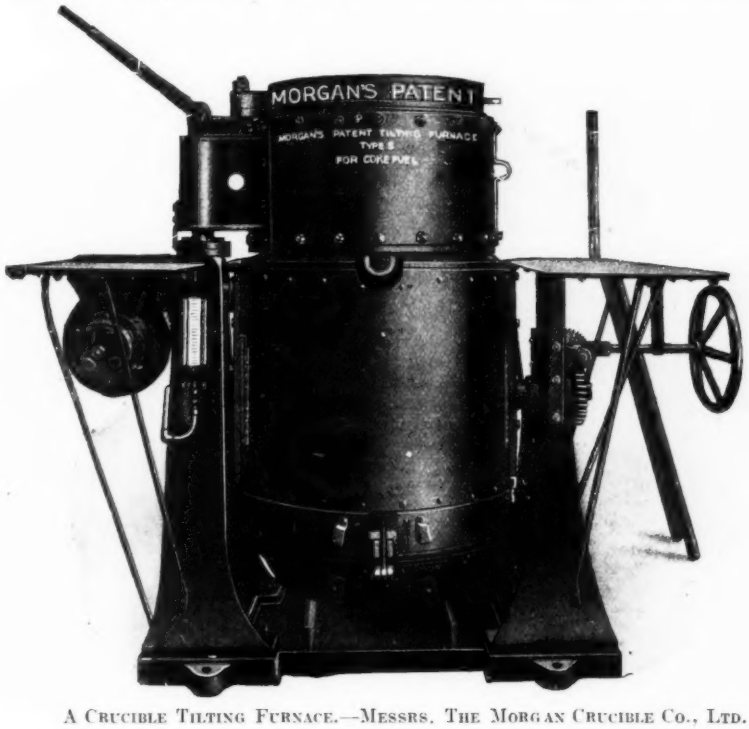
Anti-Attrition Crucibles for Gas and Oil Fires.—Crucibles subjected to an oxidising flame, such as is unavoidable in gas and oil furnaces, are found to wear prematurely owing to "perishing," *i.e.*, the burning out of plumbago.

By a new process Morgan's have now succeeded in overcoming this difficulty, and now show crucibles that will stand up under these arduous conditions as long as under the most favourable.

Self-Supporting, Non-Oxidising Basins and Pans.—For the fusion of metals of low melting point, such as aluminium, aluminium bronze, and other white metal alloys, particularly when intended for die-casting, it is advantageous to use a crucible which is self-supporting, and thus economise combustion space and furnace dimensions.

Morgan's Patent Tilting Furnaces.—One example of the range of these well-known furnaces is exhibited. The furnace chosen is one containing a crucible of 250 lbs. capacity, fired by means of oil fuel.

Morgan's system of tilting furnaces, whether



A CRUCIBLE TILTING FURNACE.—MESSRS. THE MORGAN CRUCIBLE CO., LTD.

coke, oil or gas fired, or whether designed for pouring direct into moulds or into a ladle, possess the unique feature of melting a given metal with half the fuel consumption, two-thirds the time and half the labour required in pull-out furnaces. Over 2,000 of these furnaces have so far been installed.

Foundry Plumbago.—The careful selection of plumbago necessary in the manufacture of crucibles renders it possible for Morgan's to produce the finest, most selected, stable and refractory grades of plumbago for foundry purposes. Examples of grades are exhibited, together with a mould, core and castings treated with Morgan's plumbago.

Section "B."—Electrical Exhibits.

Morganite and Battersea Carbon Brushes for foundry electrical equipment. A selection of a few of the numerous types and sizes manufactured are exhibited.

Morgan's Solid Resisters.—These exhibits illustrate an entirely new development in electrical heating. Electric heaters used for industrial and domestic purposes have so far been of the wire resistance type. The Morgan solid resister has the advantage of being cheaper, more readily replaceable, more efficient in so far as the resistance element requires no protective covering, and is, in addition, capable of being built up to form units of any dimension.

Its principal feature, however, is the fact that heat is generated in and distributed from the whole surface of the heating element with complete uniformity.

Though the exhibits only represent resistance plates, the same material can be used to form chambers of almost any shape suitable for a temperature range between 50 deg. C. and 1,350 deg. C.

NECOL INDUSTRIAL COLLODIONS, LTD.

This firm are showing plastic wood, which was recently described in these columns. It is, however, a material which can be appreciated better by handling than by description. On the stand there will be shown patterns entirely built up of plastic, and others which have been mended by its use.

This substance undoubtedly supplies a long-felt want in the engineering and foundry trades. Its use in the woodworking trades, furniture manufacture, and so forth has already been proved. There is no doubt that in any sphere of manufacture where filling, building up, and repair work of various kinds are carried out, Necol plastic wood will find its place as an accessory.

PRIESTMAN, Birmingham.

The exhibits of specification alloys by this house are designed to attract the attention of all interested in non-ferrous alloys. Here may be seen examples of the well-known "T. P. J." alloys in aluminium, gun-metal, and brass, all definite specification metals which have by their constant reliability undoubtedly removed the long-standing prejudice of the non-ferrous trade to the use of ingot metals. The alloys exhibited are aluminium sand and die casting alloy notched bars, crank case, piston, and aircraft alloys, steel-makers' aluminium sticks, aluminium bronzes, brass, gun-metal, white metal, phosphor bronze, and nickel silver ingots, copper, nickel, brass, and zinc anodes, and brass billets for forgings and extrusions.

In addition to the enormous advantages to be derived from the use of definite specification alloys, the foundry can cut out immediately the heavy and unnecessary expenses in connection with alloying. Full attention is seldom given to this costly process, so often accompanied by heavy metal losses, but, by the adoption of these specification mixtures, foundry costs can be determined at once.

ILIFFE & SONS, LTD., Dorset House, Tudor Street London, E.C.4.

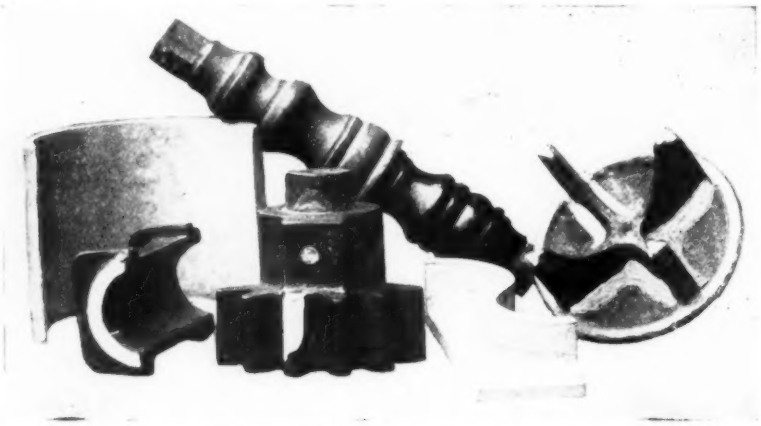
This firm of publishers are exhibiting a showcase containing specimen illustrations and typical articles on production matters from their journal "Engineering Production," a medium for the dissemination of practical information bearing upon works practice, administration and control.

W. CANNING & CO., LTD., Great Hampton Street, Birmingham.

The principal exhibit of this firm is "Reliance" foundry parting powder, a material designed to meet the necessary requirements of good foundry practice.

It is claimed to be thoroughly waterproof. It will not take up moisture, and parts the "cope" from the "drag," leaving a very fine edge.

Another interesting exhibit is "Reliance" steel wire circular brushes, which consist of wire sections placed in a position on a centre bush. They are used for cleaning castings, metal patterns, and for removing the scale from iron and steel work. This exhibit is supplemented by hand foundry brushes.



SOME USES TO WHICH PLASTIC WOOD CAN BE PUT; MESSRS. NECOL INDUSTRIAL COLLODIONS, LIMITED.

Messrs. PENMAN & COMPANY, LTD., Glasgow, are exhibiting at the stall of Messrs. John McDonald & Son, Limited, Maryhill, Glasgow, Stall No. C 8:—Weldless pressed steel ladle bowls, of 40 lbs. and 1 cwt. capacity; mounted ladles, with single and double-handle mounting, of ¼ cwt., 1 cwt., and 30 cwt. capacity, the latter being provided with enclosed gearing.

Buffing and glazing machinery and wheels form an important section. Amongst these might be included a selection of flexible shafts for attaching to polishing or grinding machines for fettling castings.

The AMALGAMS CO., LTD., 186, Attercliffe Road, Sheffield.

The principal exhibit of this concern is Sentinel pyrometers and paste. Sentinels are too little appreciated in the average iron and brass foundry, where they are of infinite use for experimental work on a reasonable scale by foremen without the necessity of buying an expensive pyrometer, the upkeep of which is often little understood.

Sentinels are cylinders of various salts melting at definite temperatures, therefore by using one just below and one just above any desired temperature can be maintained.

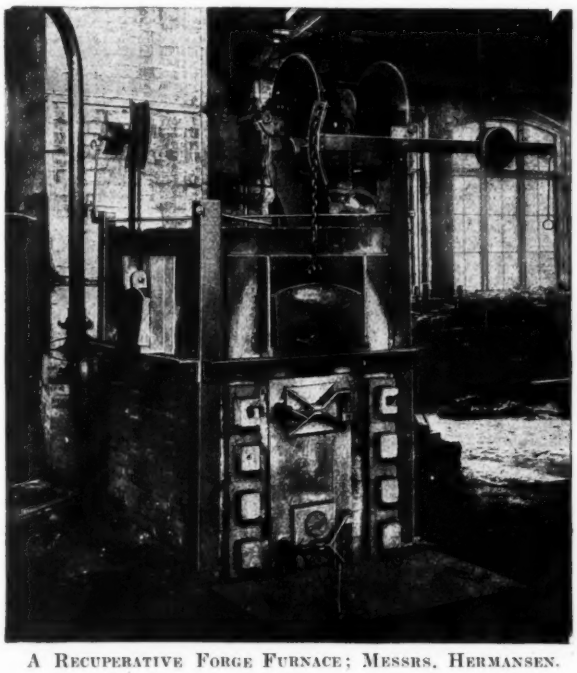
Four grades of "Ferrum cements" are also being shown, each being made to fulfil a definite purpose, the M6 brand being of most interest to foundrymen, as it is this particular brand which is used for smoothing-up castings.

A. HERMANSEN, Birmingham.

This firm is showing a new type of light forging furnace designed on the semi-gas fired recuperative principle, which is being placed on the market after having been tried out extensively.

The Hermansen producer-gas fired system, which has proved to be extremely economical for larger furnaces, working continuously, has been modified to suit small furnaces which are only worked during the day, and by suitable design it has been made possible to reach the same economy.

Its saving in fuel as compared with either town gas or oil-fired furnaces, or the ordinary open forge, is very large. As an example, the open forge used in this country often burns an amount of coal varying from 50 to 100 per cent. of the weight of iron heated, whereas this new light semi-gas fired type only uses approximately one quarter of that amount.



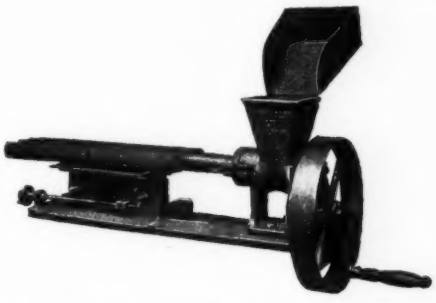
A RECUPERATIVE FORGE FURNACE; MESSRS. HERMANSEN.

Drawings of the firm's well-known types of melting furnaces are also being shown, amongst these a reverberatory refining furnace for cast iron taking a 60-ton charge, erected some years ago for a large Continental works. Core ovens and malleable iron annealing furnaces are also shown.

Messrs. SPERMOLIN, LTD., Halifax.

This firm is showing examples of "Spermolin, made" sea-sand cores which embody intricate cores for motor cylinder jackets, steam ports, sectional boilers, centrifugal pump bodies, and impellers, etc.

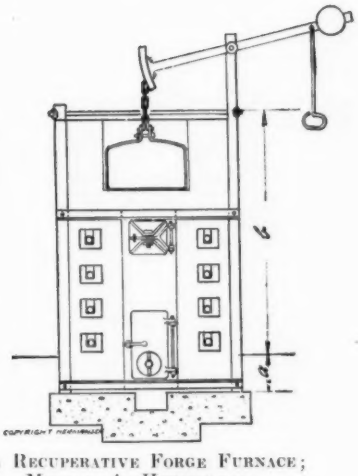
The following claims are made for "Spermolin": The ease with which the sand mixture is prepared, no milling being required. The porosity of the core thus made enables a considerable amount of venting and pricking to be eliminated, and the core is so strong that the use of cast grids is reduced to a minimum. The cores are absolutely impervious to moisture and may be left in the mould a considerable length of time without deteriorating. As the metal contracts on cooling, the core collapses, thus eliminating all danger of cracked castings, although the core remains firm until the metal is set. After the casting is taken out of the mould the core runs out in fine powder form, thus eliminating fettling.



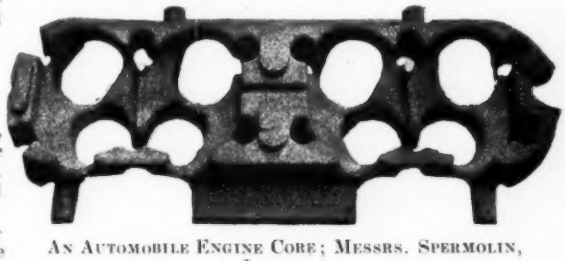
A COREMAKING MACHINE; MESSRS. SPERMOLIN, LIMITED.

At least 50 per cent. saving in time can be obtained by the "Spermolin" method.

Another exhibit of interest to foundrymen is "The Spermolin" rotary core machine which, in addition to possessing improvements on all the features of the ordinary machine, embodies a special tray carrier, consisting of a rising and falling platform, this being operated from the end of the machine by means of a small hand-wheel and screw, giving easy and fine adjustment.



A RECUPERATIVE FORGE FURNACE; MESSRS. A. HERMANSEN.



AN AUTOMOBILE ENGINE CORE; MESSRS. SPERMOLIN, LIMITED.

The aligning arrangement attached to the machine obviates any packing of trays, thereby avoiding bent and broken cores and at the same time facilitates access of the sand along the tray. Mounted on a strong cast-iron base, the machine is all one piece, with perfect alignment throughout, and all adjustments are mechanical, avoiding all hand-packing and wedging.

BRITISH REVERBERATORY FURNACES, LTD., 82, Victoria Street, London, S.W.1.

Something new in the way of metal melting furnaces is being shown by this house. They exhibit an actual 10-cwt. furnace. The essentials of the furnace are that it provides a working bed with a vaulted roof, allowing of the better control of metallurgical operations, and eliminating the use of crucibles. Data now available show the furnace to be economical in both labour and time.

This furnace may be used for melting non-ferrous metals and alloys, but is particularly applicable for melting copper alloys. It has marked advantages over the more usual method of pot or crucible furnaces, since the metal is not exposed to such an extended heating period in its molten or semi-molten condition. The more easily oxidisable metals, for instance, the spelter in brasses, are not volatilised to any appreciable extent. The furnace can be operated by one workman.

Perhaps one of the most valuable economies effected by the furnace is achieved by eliminating crucibles.

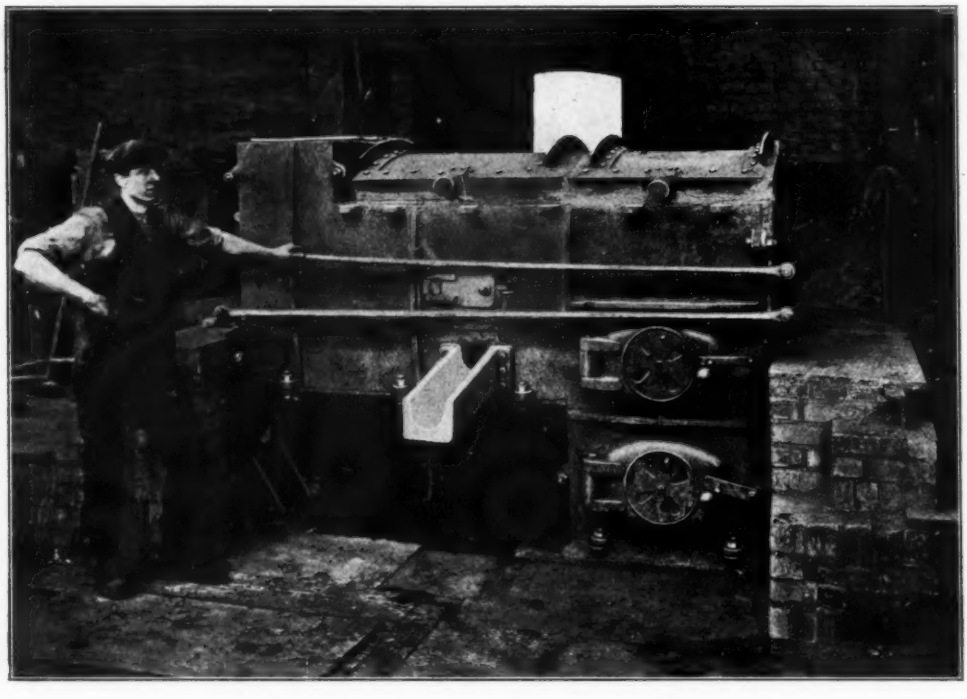
Pieces of metal up to 500 lbs. in weight can be put direct into the furnace hopper, a convenience and economy that will be readily apparent, saving, as it does, both the time and labour of breaking into smaller pieces.

When casting there is no need to run off all the metal. It is tapped like an ordinary cupola, and during any cessation of the casting out the metal is maintained in perfect condition by a gentle blast.

A considerable saving in the metal lost by volatilisation is claimed, as it is unnecessary to put in zinc and other quickly-wasting constituents of an alloy until the ingot copper or scrap has reached a fluid state. When casting phosphor bronze it is no longer necessary to add an excess of phosphor copper—one of the most expensive of alloying metals—in order to obtain an alloy sufficiently fluid for casting. This is obviated by the greater heat available, and the preservation of the condition of the metal until the last moment.

A fuel economy is claimed by the perfect combustion of fuel made possible by the design of the furnace, the air blast, and quick reduction of the metal to a molten state. The saving is considerable with the first charge, and when the furnace is used again the initial heat which is then available achieves a reduction of from 15 to 20 per cent. upon the amount of fuel which is first required.

Information regarding the furnaces of the 1-ton size, which has recently been installed in the brass foundry of Messrs. Worthington-Simpson, Limited, at Newark, and its performances, will be of value. An average figure for melting the first charge of 18 cwts. to 1 ton of metal is one hour after the furnace has been heated up until the cast is completed. They experience a loss from metal wastage of only 2 per cent. on an average, as against 3 to 4 per cent. in the crucible type of furnace; for yellow brasses the wastage is only 2 per cent., as against an average of 5 to 7 per cent. in the crucible type. It effects the fuel economies anticipated, and the ease with which the furnace is operated, and the absence of fumes and excessive heat, are greatly appreciated by those concerned.



FURNACE AT REST; MESSRS. BRITISH REVERBERATORY FURNACES, LIMITED.

Messrs. RITCHIE, HART & CO., Belfast.

This firm confine their exhibit to two specialities —the first a core-making machine and the second a foundry-floor dressing machine.

Core-making Machine.—The old method of running up loam cores on barrels supported on trestles, with one or two men turning it, is a familiar sight. With this firm's machine one man is able to perform all the operations. An increased output and truer cores are obtained. Four speeds are provided for the various operations and diameters of cores. The machine is suitable for cores from 1½ in. to 16 in. dia. and any length up to 13 ft.; larger sizes can be designed. It only requires a 1 h.p. motor or it can be driven from a countershaft.

The second speciality, that of the foundry-floor dressing machine, has already been described in our columns.

THE SHOTTS IRON COMPANY, LTD.

This firm have thought it advisable to show castings made from their various brands of pig iron, which after all is the real test of its quality.

The castings from their No. 1 pig iron are a motor stator frame, a motor end cover and a gas governor valve chest casting.

From their No. 3 soft pig iron, they show a 3½ in. one-way valve and mud box for marine engine, a marine engine reversing gear frame and various marine engine angle valves.

The castings from their No. 3 medium pig iron comprise a bored marine engine turning gear cylinder and a marine engine stop valve chest.

No. 3 hard pig iron is represented by a M.P.

cylinder for triple expansion marine engine of 30 in. dia. by 33 in. stroke. It is bored and has the valve face machined. It has been cast wholly from this brand; two machined piston rings, which have been cast from a mixture of this brand with a little scrap; a 5½ in L.P. angle valve and a stop valve for marine engines.

A small machine liner-casting is shown as representing a No. 4 soft pig iron, and for No. 4 hard pig iron a ram or plunger which has been bored and turned is shown. It has been cast wholly from this brand.

Of brass castings they show a 4 in. and 6 in. pump plunger; wagon axle bearing bushes of various types and coal-cutting machinery bushes of various types.

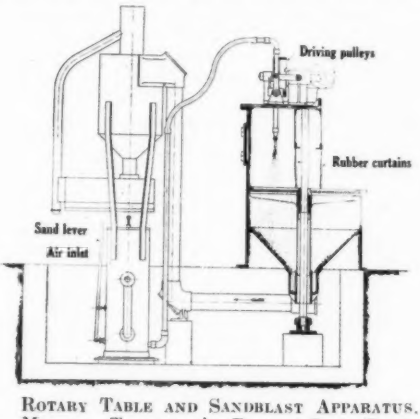
Messrs. R. J. RICHARDSON & SONS, LTD., Birmingham.

The firm are showing the products of Messrs. Tilghman's Patent Sand Blast Company, Limited, Broadheath, Manchester; Messrs. Samuelson & Company, Limited, Banbury; and Messrs. Geo. Green & Company, Keighley.

Messrs. TILGHMAN.

Amongst the specialities of Messrs. Tilghman to be seen are:—

A sandblast type of tumbling barrel, for cleaning castings weighing up to 56 lbs. each, together



ROTARY TABLE AND SANDBLAST APPARATUS. MESSRS. TILGHMAN'S PATENT SAND BLAST COMPANY, LIMITED.

with the cyclone type of sandblast apparatus and dust separating chamber. The elevation of the abrasive material is effected by exhaustion.

A sandblast cabinet with a 3-ft. square chamber, for the cleaning of small delicate or intricately cored castings is also being shown. The operator in this type of plant stands in front of the chamber with his hands through the openings holding the articles and directing the blast. Cabinets are made in any required size and with special features as required.

An interesting exhibit is a rotary table sandblast apparatus for cleaning medium-size castings with jets operating in closed portion. In this apparatus the abrasive material is elevated by exhaustion. The size of the table is 3 ft. 6 in. dia. in the apparatus shown, but actually three sizes have been standardised.

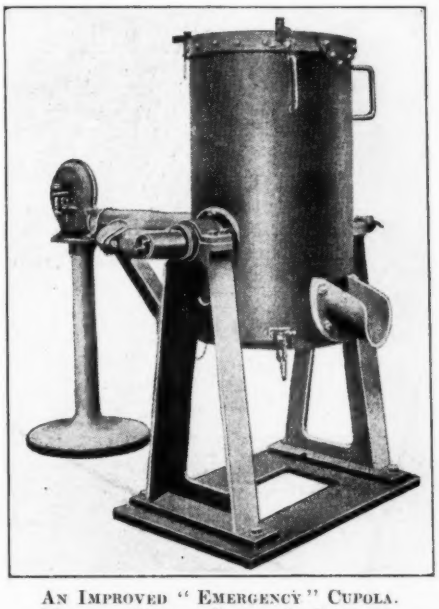
For driving the various sandblast plants a horizontal double-acting, water-cooled, enclosed type air compressor is shown. Its capacity is 116 cub. ft. of free air per min. It is fitted with patent multiple plate valves. It is suitable for operating pneumatic rammers, chipping hammers, etc. It is made in sizes from 20 to 3,000 cub. ft. capacity, and for pressures up to 300 lbs. per sq. in.

Dry vacuum pumps constitute a speciality of this concern.

Messrs. GEORGE GREEN & CO., Keighley.

Messrs. Geo. Green, who are foundry equipment suppliers, are exhibiting their No. 2½ size Green's "Emergency" cupola with "Y"-shaped blast pipes and belt-driven fan on cast-iron column, for melting approximately at the rate of 20-cwts. of iron per hour. It is equally suitable for melting either grey or malleable iron.

Other exhibits are an improved rotary core machine, for making round, square, rectangular,



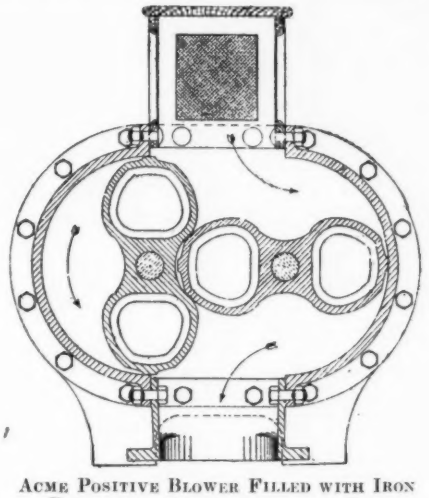
AN IMPROVED "EMERGENCY" CUPOLA. MESSRS. GEORGE GREEN & COMPANY.

and oval cores, and 2-ton capacity bottom-pouring steel ladle fitted with worm and worm wheel gearing, together with stopper gear. These ladles are made in all sizes, either geared or ungeared, with or without the bottom pouring arrangement.

Various sizes single and double hand-shank lables are also exhibited.

Messrs. SAMUELSON & CO., LTD.

The section devoted to Messrs. Samuelson includes a Root's improved "Acme" blower. This blower combines in an excellent manner the impor-



ACME POSITIVE BLOWER FILLED WITH IRON REVOLVERS EACH CAST IN ONE PIECE.

tant elements of simplicity, durability and efficiency. The revolvers being entirely of metal, are unaffected by shrinkage or swelling from atmospherical causes, and hot or cold air can be passed through the blower without producing change.

A special plate-moulding machine designed for repetition foundry work is another important exhibit. Recent improvements in this machine have rendered it adaptable to every variety of plate or die moulding, and the employment of an adjustable carriage or table enables ordinary moulding boxes to be used. The advantages of this machine are that the most accurate castings can be taken from the pattern and a perfectly smooth surface obtained, together with rapidity of work. Further,

any labourer can work the machine, for beyond ramming up the sand, no skill is required.

Another moulding machine shown is of the hand-press variety. This little machine has been specially designed for light repetition work where a deep lift is not required.

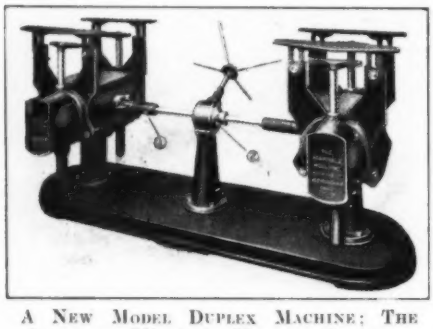
THE MAGNESIUM CO., LTD., 34a, Buckingham Palace Road, London, S.W.1.

This exhibit is representative of recent developments in the production and uses of light and ultra-light alloys which contain magnesium as a minor or major constituent. These alloys are shown in the forms of castings, forgings, extruded sections, sheet, foil, ribbon and wire.

Various standard magnesium alloys manufactured by this firm, which are now being extensively employed as de-oxidisers in modern foundry practice, are also being shown.

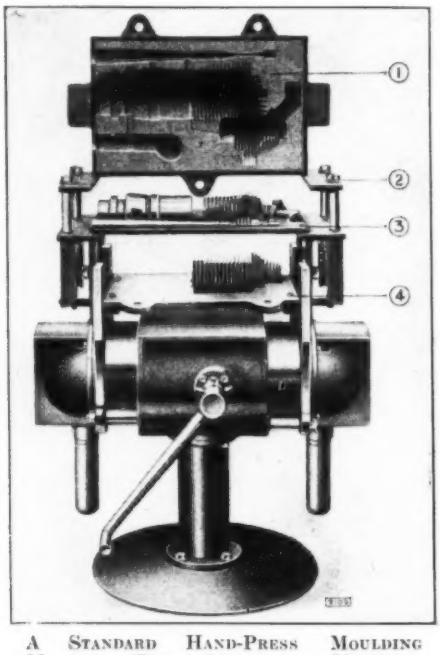
THE ADAPTABLE MOULDING MACHINE CO., Birmingham.

This firm are showing some entirely new plant which is of outstanding interest for foundrymen. Probably the machine which will create the most



A NEW MODEL DUPLEX MACHINE: THE ADAPTABLE MOULDING MACHINE COMPANY.

interest will be a new design of mechanical sand riddle. It differs materially from all others we have seen, insomuch that it can be either belt or hand driven. It is not claimed to be portable, but is of a type where several could be advantageously installed in various parts of the foundry. It is so

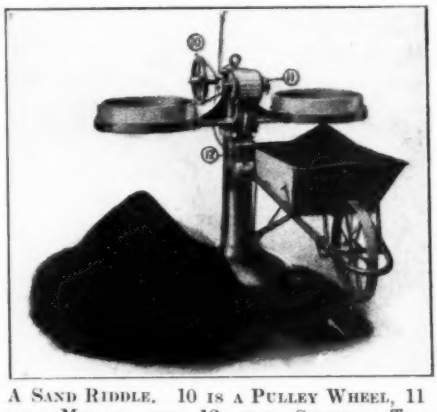


A STANDARD HAND-PRESS MOULDING MACHINE. THE ADAPTABLE MOULDING MACHINE COMPANY.

arranged that it can take any standard size of riddle. Several standard machines are being shown, making pulleys, air-cooled cylinders, and other moulds.

A turnover machine of a larger type, but hand operated, is being shown engaged on making pulley moulds.

A new model, specially designed for the Exhibition, is a duplex straight-draw machine, with standard machines on a common base. This is a compact machine, with star wheels placed in between the two. A second entirely new duplex machine, of the roll-over type, and capable of taking 12-in.



A SAND RIDDLE. 10 IS A PULLEY WHEEL, 11 THE MOTOR, AND 12 THE SWITCH.—THE ADAPTABLE MOULDING MACHINE COMPANY.

boxes, is also being shown. In addition to the above there is a large assortment of core machines, pattern plates, castings, moulding boxes, snap flasks, and other miscellaneous foundry plant.

THE UNIVERSAL GRINDING WHEEL CO., LTD.

This firm are exhibiting a comprehensive collection of grinding wheels for all purposes in connection with the foundry trade. Wheels specially designed for each metal will be shown. For example, "Uni" carborundum wheels for cast iron and brass, and "Bauxilite" wheels for steel and tools. There will also be shown work finished by means of their products.

The back of the stand is arranged to form a small cinema theatre, in which films will be shown detailing every operation in the manufacture of a modern grinding wheel

THE BIRTLEY IRON CO.

The exhibits on this firm's stand consist of a representative collection of high-grade iron castings manufactured by them.

Particular attention should be given to the sections taken from a turbine reduction gear wheel centre and from a piston valve locomotive cylinder. Both castings are said to be a novel process adopted by this Company to ensure absolute soundness of section. Large wheel centres for instance, weighing up to 5 tons, vary in thickness from 1¼ in. to 6 in. around the boss, and all chances of porosity in the heavy sections have been obviated by this method, whilst in the case of the locomotive cylinder, maximum resistance to wear has been

A TYPICAL EXHIBIT OF FINISHED CASTINGS. THE BIRTLEY IRON COMPANY.

achieved, retaining at the same time ease of machining. Sulphur prints and microphotographs confirming these claims and showing the fine grain structure of these castings are also exhibited.

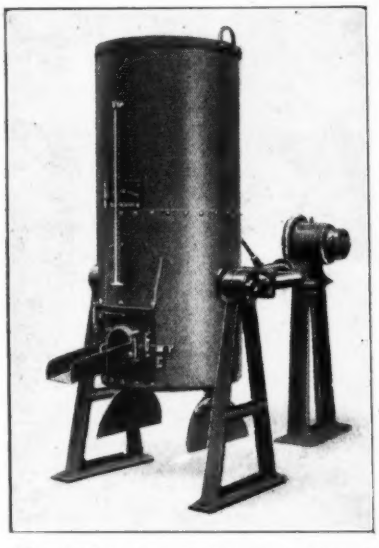
Other interesting examples of intricate founders' work are shown—an economiser tube of 4 in. in-

side dia. and 4.9/16 in. outside dia. and 8 ft. long, with a longitudinal web 9/16 in. thick and a gilled cooling pipe, requiring exceedingly difficult coring, indicate the complicated class of work undertaken. A wide variety of pipe work and of general castings for industrial and other establishments, and a selection of patterns for machine and floor moulding illustrate the diverse products of this firm.

Amongst other castings shown are various pieces for collieries, railways and industrial plants; socket and spigot and lug pipes with chilled or machined flanges; flanged pipes; castings for frictionless rollers and sheaves; cylinder liners; inspection boxes and covers and engine castings. Both built-up patterns and patterns mounted on plates for machine moulding are also shown.

THE CONSTRUCTIONAL ENGINEERING CO., LTD., Birmingham.

This firm is perhaps best known as manufacturers of cupolas, especially the smaller variety, which they designate "cupolette." Originally this was designed as an emergency plant, but it proved to be sufficiently efficient as to form the sole melting unit of some of the smaller foundries. Both cupolas and cupolettes are being shown at



No. 3 CUPOLETTE, SHOWING MOTOR-DRIVEN FAN; THE CONSTRUCTIONAL ENGINEERING COMPANY.

Birmingham. It should not be assumed that this firm confine their attentions solely to melting plants, as they also design air receivers, charging machines, core stoves, electric winches, foundry ladles, hoists, runways, sandmills, tumbling barrels and sand-handling plant, besides dealing in all the usual foundry requisites.

PENTON PUBLISHING CO., Cleveland, Ohio, U.S.A.

This firm of publishers have on their stand literature and photographs dealing with their technical papers—The Foundry and Iron Trade Review.

THE GENERAL REFRACTORIES CO., LTD.

This firm are exhibiting a variety of refractory materials, including their well-known Yorkshire sand, which is largely used by steel founders, both for making moulds and cores.

Another exhibit of interest to steel founders is "All-British" magnesite and chrome bricks, powdered and pea-size chrome and magnesite.

A core compound, "Avbean," already renowned on the Continent, should prove an interesting exhibit for foundrymen.

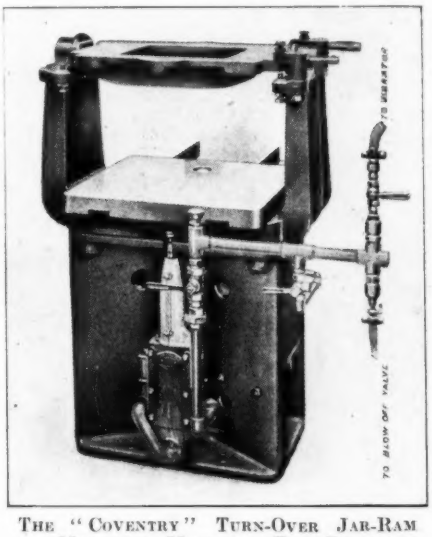
Amongst other materials exhibited are: Best and ordinary silica bricks; white Derbyshire ganister sand and black Sheffield ground ganister for lining cupolas; firebricks, both Ambergate and Deepcar qualities; stoppers, nozzles, and sleeves, for use in steelworks; ladles, ladle bricks, pot stands, steel moulders' composition, ground fireclay, fluor spar, fluor spar gravel, fluxing stone for cupolas, red and yellow moulding sand for iron and brass, high-silica sand for steel foundry use and furnace bottoms, silica cement for high temperatures, silica flour for painting moulds, etc.

CARBIC, LTD., 51, Holborn Viaduct, London.

This firm is showing a complete range of acetylene generators, based on the use of carbic cakes and auxiliary apparatus. The Carbic system was recently dealt with in our columns.

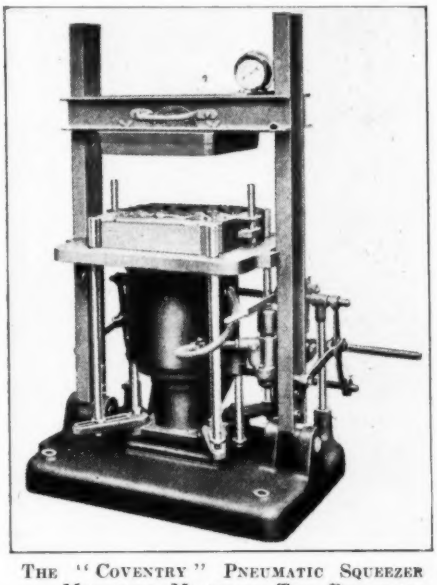
THE BRITANNIA FOUNDRY CO., Birmingham.

This well-known firm of moulding machine manufacturers have seven exhibits all relating to this subject. They are as follows:—(1) No. 1, Britannia jar-ram moulding machine, provided with self-contained pattern-drawing apparatus, suitable for



THE "COVENTRY" TURN-OVER JAR-RAM MOULDING MACHINE; THE BRITANNIA FOUNDRY COMPANY.

any mould up to 10 cwt. (2) No. 00, Coventry Patent turn-over jar-ram moulding machine, to take moulds up to 18 in. sq. with 8 in. pattern draw. (3) A No. 0 moulding machine, which is similar to the No. 00 but is provided with a 15 in.



THE "COVENTRY" PNEUMATIC SQUEEZER MOULDING MACHINE; THE BRITANNIA FOUNDRY COMPANY.

pattern draw. (4) Coventry Patent pneumatic squeezer moulding machine with 6 in. pattern

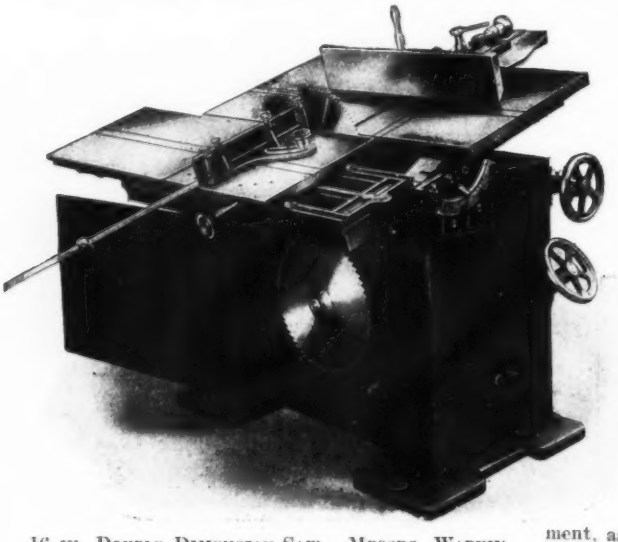
draw to take moulds up to 18 in. by 12 in. and 16 in. sq. (5) Coventry Patent hand-power moulding machine with 8 in. pattern draw and suitable for moulds up to 16 in. by 14 in. (6) No. 13 air compressor, capable of delivering 40 cub. ft. of free air per minute, at 100 lbs. per sq. in. (7) No. 2 air receiver.

WADKIN & CO., Leicester.

Mechanical Woodworker.—This machine has been specially designed to deal with all kinds of pattern-making, and has been supplied to all the leading Governments, engineering works, ship yards, motor works, etc., in all parts of the world. The spindle can be canted to any angle between the vertical and the horizontal, and may be rotated in either direction. The table is provided with right-angle motion operated by handwheels, and is also provided with split nut release to enable table to be floated by hand. The table may be raised and lowered, and can be turned in a complete circle upon the central pillar.

The table body travels upon a runway, and is operated by rack and pinion. The machine can be supplied arranged for motor drive or for any form of belt drive.

16 *in. Universal Double Dimension Saw.*—A high-class tool, embodying all refinements necessary for sawing to accurate dimensions, either with or



16 IN. DOUBLE DIMENSION SAW.—MESSRS. WADKIN & COMPANY.

across the grain, without changing saws. It is specially useful for pattern-making. There are two saw spindles mounted in ball bearings, one carrying the ripping saw, and one the cross cutting saw. Either saw can be brought into operation instantly by handwheel motion. The table can be canted to 45 deg., and the front portion slides past the saw on ball bearings.

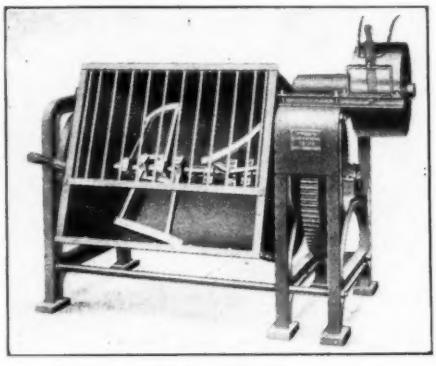
18 *in. Saw Bench.*—A new and unique design, provided with rising and falling table mounted in heavy circular slide. The spindle runs in ball bearings.

20 *in. Combined Surfacing and Thicknessing Machine.*—A new heavy model for surfacing, planing out-of-wind, bevelling, trying-up, rebating and chamfering, tonguing, grooving, moulding, jointing, etc. The surfacing tables arranged to cant for taper planing. The feed gears are totally enclosed, running in oil. Safety circular cutter-block, the spindle running in ball bearings.

30 *in. Band Sawing Machine.*—Containing all the latest improvements. It is provided with guards to ensure safety to the operator. Spindles are mounted on ball bearings.

High-speed Boring and Overhead Recessing Machine.—An ideal machine for boring, recessing, and light pattern work. The spindle runs in ball bearings and is provided with two speeds. The table has horizontal, lateral, and vertical movements.

30 *in. Combined Disc and Vertical Bobbin Sander.*—By the use of combination, a very large percentage of hand work is obviated, as both square external radius and bevel work can be finished on



AN OIL MIXER.
THE FORDATH ENGINEERING COMPANY.

the disc portion, and square and bevel radius work both internal and external can be finished on the bobbin. The machine is self-contained.

Vertical Reciprocating Belt Sander.—A new type of wood grinding machine for all kinds of straight and curved work. The canting tables enable the machine to grind accurately both square and bevelled work. Provided with reciprocating motion to enable perfectly clean and smooth work to be produced.

Wood Turning Lathe.—Fitted with gap bed and extended spindle for carrying an overhead face plate for turning large work. Provided with travelling rack carriage.

Heavy Vertical Spindle Moulding Machine.—Our latest model, fitted with self oiling bearings, for all kinds of straight or irregular shaping.

THE FORDATH ENGINEERING CO., LTD., West Bromwich.

This exhibit is mainly interesting for the core-making department, as their chief specialities are Glyso—a coil-oil—and the Fordath oil and sand mixer.

Glyso.—For this core oil the manufacturers claim that cores made from this compound may be transferred from bench to oven without risk of breakage; that they require less heat to bake; that they are both hard and porous; and that they disintegrate at the correct temperature.

Fordath Mixer.—This machine is designed to handle 5 cwts. of sand at once and complete the mixing in ten minutes, after which the mixture is automatically discharged. To facilitate this, the pan is mounted on trunnions and is lifted by a side lever. The manufacturers claim a 50 per cent. saving of labour and 20 per cent. of oil. It takes up 6 ft. by 3 ft. of floor space, and requires 5 h.p. to drive it.

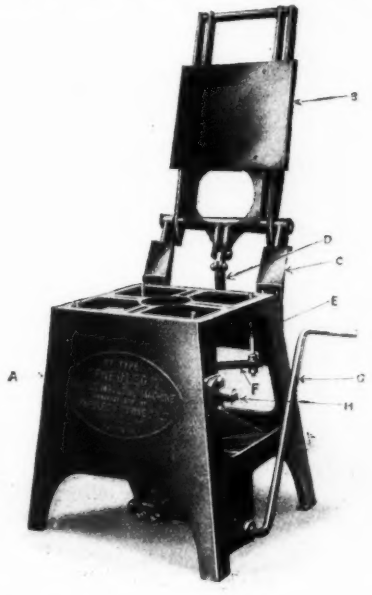
THE PNEULEC MACHINE CO., LTD. Smethwick, Birmingham.

The well known house of moulding machines have arranged a very comprehensive exhibit of their machines, which includes the following:—

"Pneulec" Jar Ram Electrically-operated Moulding Machine.—This machine is entirely independent of air compressors, being operated only by electricity. In case of necessity the machine can simply be placed on a firm foundation, and connected up to the nearest electric main. This machine is the outcome of lengthy experiments of moulding machines of all types, and is reliable, speedy, easily maintained, economically operated, self-contained, and efficient.

"Pneulec" Tamper Moulding Machine.—This

is somewhat of a new departure. It has been designed specially for the making of light repetition castings where the moulds required are comparatively shallow, say, up to 6 in. deep, but whilst



P.T. TYPE MOULDING MACHINE; THE "PNEULEC" MACHINE COMPANY, LIMITED.

this class of work is most suitable, it can still be used for making moulds which have to be rammed by hand to a large extent, *i.e.*, it can also be used as an ordinary hand ram machine.

"Pneulec" P.H. Hand Ram Moulding Machine.—This has been designed to meet the demand for a simple, and inexpensive machine, capable of making a great variety of work, and having a considerable range in sizes.

Core Stove and Drying Ovens.—The "Pneulec" core stoves are the result of long experience in actual foundry practice. They are made of heavy gauge sheet steel, built on a steel framework. Every stove is double cased, *i.e.*, there are really double walls or sides to the stove, of sheet steel. These walls are placed 2 in. apart and the space between them is filled with silicate of cotton, a material with a high resistance to the conduction of heat. The object of this is, of course, to keep as much heat as possible in the stove, and so save fuel. "Pneulec" stoves are specially adapted for use with oil sand cores, and a temperature of over 315 deg. C. can be attained if required.

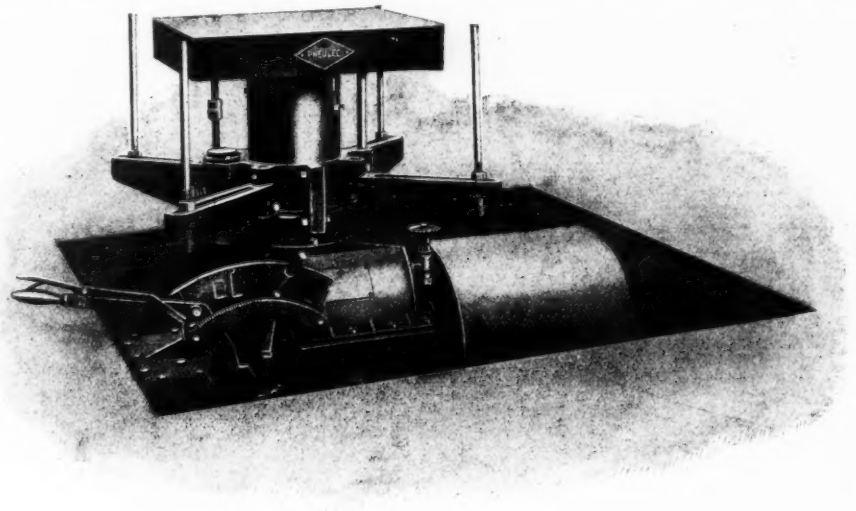
Another speciality which is shown is a blacking sprayer. Two types are made for high and low pressures.

Two core oils are exhibited, known as "Pneucol" and "Lectol." The reason for proposing two oils is that during the experimental stage it was found that whilst it was possible to produce a fairly inexpensive oil ("Lectol") which would do for the majority of work, cores of an exceptionally intricate and fragile nature were not so absolutely satisfactory as could be wished. The company therefore introduced another oil ("Pneucol") which was made only from the finest constituents obtainable, and was intended for use on delicate and intricate corework.

ALLDAYS & ONIONS, LTD., Birmingham and London.

The principal exhibit shown by this firm is their improved rapid Climax cupola, capable of melting from one to two tons of metal per hour, fitted with spark arrester and drop bottom, and complete with staging and hand-operated hoist. A feature of this exhibit is its substantial construction, the cupola shell being built of mild steel plates, riveted together with lap joints. A hinged steel door is fitted to the charge hole and the fettling hole is provided with loose mild steel door, with cross bar and fittings. The air belt is of ample dimensions, and fitted with the usual elbow pipes and wing valves for blast. Opposite each tuyere, mica sight-holes and doors are provided. The tuyeres are bolted to the inside of the shell, thus excluding the possibility of blast leakage between the lining and the shell. The cupola is carried on heavy cast-iron pillars, the drop bottom consisting of hinged doors, provided with draw bar and fittings. A receiver, connected to the shell by an iron casting, lined with firebrick, may be fitted if required.

For driving the cupola a Duplex fan is shown. This machine is built up of substantial cast-iron



P.E. TYPE OF ELECTRICALLY-DRIVEN MOULDING MACHINE; THE "PNEULEC" MACHINE COMPANY, LIMITED.

volute casing, with all joints machined. The fan runner is of the multi-blade type, constructed of sheet steel, and balanced on a ground mild-steel shaft which runs in ball bearings. These bearings are carried in dust-proof housings, and are provided with grease cups for lubrication. The machine exhibited is arranged for belt drive, but could be readily adapted for direct motor drive. In the case of motor-driven machines, the motor is carried on a substantial cast-iron stool, and the fan runner is mounted on the end of the motor shaft; but for the larger sizes the drive is effected through a rubber-bushed flexible coupling.

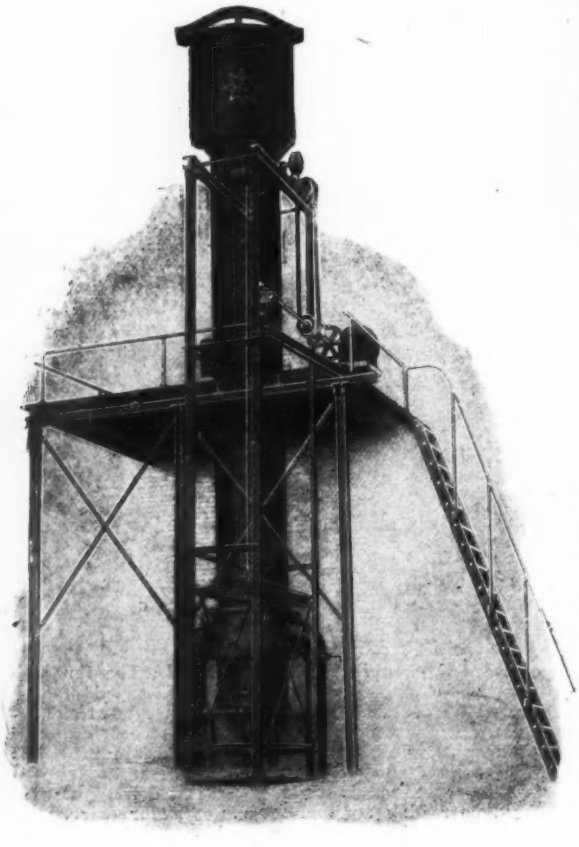
Alternatively, a Roots' blower may be used for supplying the blast required by the cupola. The machine shown is made of cast iron, the cylinder being ribbed where necessary. The flanges, revolvers, etc., are all carefully machined, and the

gear wheels are machine cut from solid blanks. The cast-iron covers in which these gears are encased form an oil bath. Particular attention has been paid to the bearings, which are in the form of heavy gunmetal sleeves, of the cone type, thus the wear is taken up by the adjusting nut. These machines may be adapted for drive by electric motor or steam engine. In this case the bedplate is extended to carry the motor or engine, and the drive is effected through reducing gear or coupling, as required.

The sand mill shown is fitted with fast- and loose pulleys, self-delivering fixed pan, and is actuated through gearing underneath the pan. The bearings are of generous proportions, and special attention has been given to the rolls and other wearing parts.

The steel shaking or tumbling barrel exhibited is especially suitable for cleaning light work. It is constructed in ⅜-in. steel plates, welded, provided with open and close lid and fasteners, trunnions, and is mounted upon cast-iron "A" standards. The standard equipment includes fast- and loose-pulleys.

A sand mixer and disintegrator is included in the plant shown, this machine being suitable for mixing sand or for breaking or mixing slag, coal, coke, etc. A distinctive advantage claimed by the makers for this machine is the adjustable reel, which can be regulated with very little trouble to give any desired fineness to the sand or other material which it is desired to grind or mix. The adjustment is carried out without the necessity of partially dismantling the machine and substituting other reels. Roller bearings are employed throughout, arranged to take up automatically the end thrusts, and effectively protected from the penetration of grit. The material is fed into the hopper and immediately caught by the first revolving cage, which has the effect of breaking the



CUPOLA WITH COMPLETE STAGING; MESSRS. ALLDAYS & ONIONS, LIMITED.

material up and scattering it among the other revolving cages. Each cage through which the material must pass is fitted with spindles of a closer pitch than those of the previous cage, so that by the time it reaches the last one it is reduced to the finest powder. The casing which encloses the revolving cages is of steel plate, firmly secured to the main frame casing and tied by steel stays. This steel casing gives immunity from breakage.

The remaining items on this stand comprise a double-cased, gas-fired core oven, constructed of steel sheets and channels, packed throughout with a 2-in. thickness of non-conducting material, and provided with a pair of double-cased hinged doors. Ovens of the single- or treble-cased types are arranged for either solid-fuel or oil-firing.

The ladles shown constitute a very useful range.

McLAIN'S SYSTEM, Milwaukee, U.S.A.

This stand is being represented by Mr. David McLain himself. Mr. McLain has world-wide

BLOCK CYLINDER.

EXHIBITS OF SEMI STEEL—THE TWISTED BAR CONTAINS 2.26 PER CENT. MANGANESE; THE BLOCK CYLINDER IS MADE FROM 35 PER CENT. STEEL, AND GAS AND AIR-MIXER (OF ½ IN. SECTION) FROM 30 PER CENT. STEEL—McLAIN'S SYSTEM INC.

reputation as a semi-steel expert, and is the originator of a correspondence course on this subject. The exhibit consists of sample castings of semi-steel containing 20 to 50 per cent. steel. Such castings are claimed to resist ammonia, air, steam, water and other pressures, and have a tensile strength ranging from 13. to 17.8 tons per sq. in.

Other samples shown are: Gears; automobile cylinders; pistons of light sections containing 20 to 30 per cent. of steel; annealed semi-steel hatchets, claw hammers, and automatic tools. Foundrymen following McLain's system are stated to have produced machinable castings of light section made from a 30 per cent. steel mixture, and containing 2.25 per cent. manganese.

A. W. SAINSBURY, LTD., Sheffield.

This house has specialised in swing grinders. This particular tool is used very extensively in the crucible steel trade for dressing the surfaces of ingots, but it has not yet received the attention from foundrymen that it merits. The Germans had just started to introduce them into the foundries before the war, but the models were far too heavy, and unbalanced. The types shown by this house are light and handy, and should receive attention from British foundrymen, as they are popular both in the States and Canada.

Messrs. W. & T. Avery, Limited.

This is one of the works to be visited by members of the Institution of British Foundrymen on Friday, June 23.

Historical.

It would be wholly impossible to dissociate the Soho Foundry with the name of that master engineer, James Watt, whose inventive genius did so much to revolutionise the industries of the world rather more than 100 years ago.

The original Soho factory was built by Mathew Boulton at Hockley Brook, now within the city of Birmingham, for the manufacture of buttons, medals, coins, silver-plated goods, etc. Shortly afterwards James Watt left Glasgow, and entered into partnership with Boulton and settled at Soho.

As the outcome of lengthy experiment he built his first steam engine, which was ordered by John Wilkinson, to blow the bellows of his ironworks at Broseley, Staffs. This engine proved entirely successful, and in order to meet the world-wide demand for similar units, the partners built the Soho Foundry on the site it occupies to-day.

In later years, when the founder of Soho had passed away, to be followed some ten years later

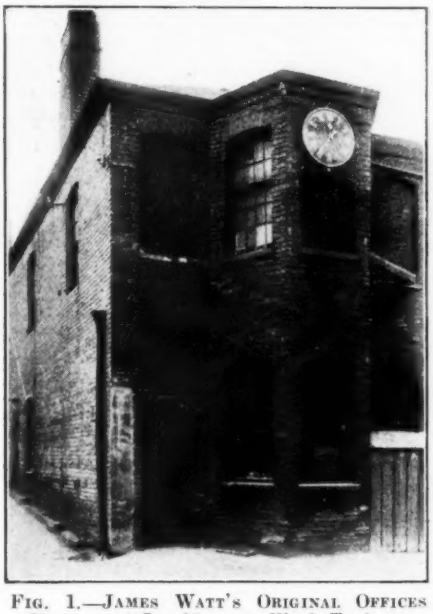


FIG. 1.—JAMES WATT'S ORIGINAL OFFICES BUILT IN 1876; MESSRS. W. & T. AVERY, LIMITED.

by James Watt, the factory was deserted, parts of the buildings and much of the plant demolished. The old factory, however, has fathered many useful arts and industries, and perhaps the most fitting memorial to the great inventor is that upon the site of his early activities has grown up a works devoted to a range of manufactures demanding a perfection in design, an accuracy of manufacture, and a soundness of material which would have delighted the founder of the Soho Foundry.

To describe in detail the works and manufactures of Messrs. Avery would occupy more space than we have at our disposal, and, further, such description would merely be that of an up-to-date engineering works. Considered from the historical side, however, the works are unique, and it is from this standpoint that they will appeal most strongly to the visitors. Naturally, many of the old buildings have been demolished and their site and the adjoining land occupied by more extensive modern shops, but so much of the original works as could be have been preserved by Messrs. Avery. The original foundry building, of which the walls and the oak crane runways bear evidence, is still doing duty as part of the present foundry, whilst the erecting shop, saving, of course, for the introduction of modern machinery, is still an erecting shop and is much the same as it was a century ago. The oak runways, with additional supports, are still doing duty, and, what is even more interesting, some of the original machines are still in daily service. In this connection particular mention may be called to the wall planer, which there is little doubt was the first of such machines ever built. For this machine, a new guide screw was cut over a quarter of a century ago, and this rests upon a shelf above the machine, the screw, which has probably done service since the machine was first put on duty, still being in excellent condition. There is also an original face-plate lathe, which, with its pit in service, will take work up to 15 ft. in diameter, and, finally, there is a radial drill which formed part of the original complement of tools.

Outside the shops the old clock placed over what was once the main entrance to the works keeps good time, and what were then the private office of James Watt and the general office of the staff are now in occupation of the publicity department. This now important part of a great business organisation is, as conducted at Messrs. Avery's works, amongst the most revolutionary developments of the period. In the matter of publicity the camera plays a very important part, even to the use of the ultra rapid camera, which, making possible the taking of some 360 negatives per second, furnishes a permanent sight record of what actually takes place with material under test. In addition to the photographic work, however, the publicity department finds employment for a staff of highly-trained artists.

In the grounds is to be seen the first gasometer ever constructed. From this pipes were conveyed across the meadow land to Murdock's house, which was the first residence to be illuminated by gas. Murdock is one amongst so many whose activities have not received the generous recognition in industrial history justified by the importance of their work. This perhaps in Murdock's case is mainly due to the fact that throughout his life he was overshadowed by the grand old engineer. Watt was not only a man of considerable education, but he was also a man of forceful personality. On the other hand, Murdock was uneducated and of a retiring disposition, but he was nevertheless a born genius. As a young man he invented oval turning, and, as everyone knows, he was also responsible for the invention of gas illumination. But it is not so generally known that he it was who first put a mechanically-propelled vehicle upon the road, though this innovation was very ill-received, for when he enthusiastically described his travels through Cornwall to his employers he was curtly told not to bother about his steam carriage, but to attend to his work.

Under portions of the works are very large subterranean passages leading in various directions. These are remarkably well built and quite dry. To-day they serve for the storage of more or less obsolete patterns and the like. To what use they were put in the old days is unknown, though it is certain they could not have been used for purposes of manufacture. In some of the passages are to be found old patterns, notably part of a pumping engine, and also a pipe branch. The finish of these patterns is really beautiful, and well worth a close inspection. There are also a few of the early castings.

Before dealing briefly with the works as we find them to-day, it may be mentioned that orders are still received by Messrs. Avery for repairs of some of the old types of engines. In 1909 the firm cast new wheels from the old patterns, and put into running order an engine which was built in 1864.

The modern works are fronted by the usual offices: the reception-room, however, is distinctly unusual in its striking originality and artistic conception.

The whole of the works yards are circled with a network of railway track, the sidings connecting up directly with the main line of the L. and N.W. Railway, and in addition an arm from the Birmingham Canal serves the stocking ground immediately at the back of the foundry.

The Pattern Shop.

The pattern shop occupies a building 150 ft. by 40 ft., the rough sawing and planing is done in the timber shed which adjoins, whilst in the pattern

shop is the usual equipment of band and dimension saws, sand-papering machines, lathes, etc. The patterns are stored in a two-storey building, each floor being 160 ft. by 40 ft.

In addition to a five-ton loco. crane which travels the whole of the works sidings, the foundry yard is served by three Edison one-ton electric

The Foundry.

The whole of the moulding is carried out in green sand. The sand plant comprises two mills and a sand mixer. Old sand is re-used for core making.

The foundry floor for heavy work is covered by two bays each 120 ft. by 40 ft. In the one bay

FIG. 2.—THE FOUNDRY; MESSRS. W. & T. AVERY, LIMITED.

FIG. 3.—LIGHT CASTINGS SECTION OF THE FOUNDRY; MESSRS. W. & T. AVERY, LIMITED.

trucks, which draw the material from the various piles, according to the mixture required, and delivers it to the one-ton furnace hoist. This delivers to a platform affording storage for some 20 tons, which is common to the three cupolas of 8-, 5-, and 4-tons melting capacities respectively. Blast is supplied by two Alldays & Onions fans, which are each belt-driven from a Westinghouse 33-h.p. motor; one of these set stand-by.

are cranes of 15- and 5-tons capacity, and in the second bay two 5-ton cranes. This portion was the original Boulton & Watt Foundry, and in its pits were cast cylinders up to 30 tons in weight. There is an extension to the foundry taking the form of a main bay at right angles to the old portion, and with a total length of 350 ft. In this bay the light and medium castings are made. There are three machines and one assembling machine by

the Universal System of Machine Moulding, London, and also a number of hand-moulding machines. Metal is tapped into 6-cwt. bogie ladles, which travel on a narrow-gauge track.

Amongst the buildings grouped round the main shop, but separately housed, is a machine-moulding shop, which is devoted to small repetition work, such as weights and the like. In this shop is a Herbert sand mixer and two hydraulic machines. Other shops are for large cores, which are dried by two gas-fired stoves, for the production of small cores and the casting of metal pattern plates. In the last-named is a coke-fired melting furnace.

Heavy work is fettled at one end of the main bay, pneumatic mains being laid throughout the foundry.

Light fettling is done in an annexe 100 ft. by 30 ft., which contains a revolving-table sand blast apparatus and five double-head grinders, whilst in a separate room are three tumbling barrels. Still in the same group of buildings is the metal-pattern finishing shop, 50 ft. by 20 ft., and here also are stored in racks the patterns for weights of all standards.

The foundry floor is some 20 ft. below the ground level of the erecting shop, with which it joins in parallel. Pits are provided at either end of the erecting shop for receiving the castings from the foundry, the one pit serving for what may be de-

FIG. 4.—THE MACHINE SHOP; MESSRS. W. & T. AVERY, LIMITED.

FIG. 5.—JAMES WATT'S ERECTING SHOP; MESSRS. W. & T. AVERY, LIMITED.

scribed as finished parts and the second for parts requiring machining.

The weighbridge-erecting shop is covered by three bays, each served by a 35-ton crane. Castings are delivered from the landing of the pit under the crane runways of either bay by a rope-hauled trolley.

The main equipment of the machine bay consists of a Hulse double saddle planer for the simultaneous planing of both sides of the frames. This machine is driven by a 16-h.p. motor, and two special machines for machining the slots in the levers for the reception of the bearings for the knife edges. Each of these machines is driven by a 4-h.p. motor.

The second bay is given over to the erection of heavy weighbridges, which are built with weighing capacities up to 50 tons. One notable machine in course of erection has a length of platform of 44 ft. 6 in. The third bay is devoted to the assembly and erection of platform and other special light weighing machines.

Small parts requiring machining pass straight through the erecting shop to the machine shop, and after machining are returned to the erecting shop.

FIG. 6.—ONE OF THE THREE BAYS OF THE WEIGHBRIDGE ERECTING SHOPS; MESSRS. W. & T. AVERY, LIMITED.

It may be noted that before leaving the shop all machines are tested under actual full-load conditions.

The small-machine shop is covered by three bays, each 400 ft. by 30 ft., and contains upwards of 300 machines, many of a special nature. The heat-treatment shop, which adjoins the machine shop, is equipped with gas-fired muffle furnaces, which for the most part have been designed by the works staff.

The polishing shop contains 18 emery wheels, 15 bobs and 6 mops. The work carried out in this shop is considerably more than what is usually understood by polishing. The castings are received in the rough, and work usually regarded as machining is done on the grinding wheels. Finally, after polishing, the work is plated in a room at the end of the shop, and leaves as a finished article for assembly or despatch as the case may be.

The brass foundry, 40 ft. by 18 ft., has a 10-pot coke-fired furnace, and is served with a gas-fired core-stove.

The manufacture of automatic machinery for the weighing of coal, grain, etc., as also for the weighing of liquids, is a very important branch of the company's activities, and for these manufactures there is a practically self-contained works, which have been built round the old machine shop already referred to. Extensive pits are provided for the erection of the various units, all of which are tested under working conditions.

There is a well-equipped laboratory where samples of all raw material are analysed, and where the chemist, acting in conjunction with the foundry manager, determines the particular mixtures. Attached to the laboratory is the test house. As Messrs. Avery are specialists in the building of all classes of testing apparatus, the equipment of this shop is naturally very complete for the carrying out of every form of physical test.

Union List of Metallurgical Periodicals.

The British Non-Ferrous Metals Research Association has just issued, in its quarterly Bulletin, a Union List of Periodicals of interest for reference on industrial metallurgy. The service provided by 14 libraries in London, Birmingham, and Manchester is clearly indicated so far as concerns the 118 periodicals which have been selected, and the next edition will include additional libraries and periodicals which experience with the present list suggests as desirable.

Since one of the main functions of the Industrial Research Associations is to serve as distributing centres for scientific and technical information to their members, such a key index should prove of great value, and will doubtless be followed by other bodies for their own special subjects.

It may also be taken as an indication of the interest that is likely to be taken in the proposed World List of Scientific Periodicals of the Conjoint Board of Scientific Societies.

Hydro-Electric Power Developments in India.—The first triennial report of the Hydro-Electric Survey of India estimates the probable minimum continuous water power in India at 5,582,000 kw. on absolute minimum flow, at 7,532,000 kw. on ordinary minimum flow, and at 12,680,000 kw. as the probable power for maximum development. The figures are believed to be conservative estimates so far as concerns investigated sites; there doubtless remain many other unknown sites. The Provinces or States of principal interest from the point of view of water power are Assam, Bengal, Bombay, Burma, Central Provinces and Berar, Jammu and Kashmir, Punjab and canals, and the United Provinces and canals.

Messrs. Belliss & Morcom, Limited.

This well known house is another concern which is to be visited by members of the Institution of British Foundrymen on Friday, June 23.

The hackneyed phrase, "Great things spring from small beginnings," is nothing more than a recognition of the law that in industry, as in nature, there must ever be movement in one or other direction, and obviously it is only the forward movement which can survive; happily, in the forward direction, there is no limit, because there can be no finality in things mundane.

The evolution of a mechanical triumph is a matter of sustained effort; its conception may possibly result from inspiration, but it is a far cry from the birth of the idea to the finished machine, the ladder between failure and success must be climbed, step by step; there is no lift to elevate one, neither is there any congestion at the top—the crowd are at the bottom.

The Belliss engine furnishes a very apt illustration of the foregoing, being the outcome of patient experiment and consistent development during nearly three-quarters of a century. The foundation of the present business was laid in 1852 by the late Mr. G. E. Belliss, who established himself as a general engineer, prior to the age of the specialist, in a small works in Broad Street, Birmingham. Quite early in his business career, how-

FIG. 1.—THE PATTERN SHOP; MESSRS. BELLISS & MORCOM, LIMITED.

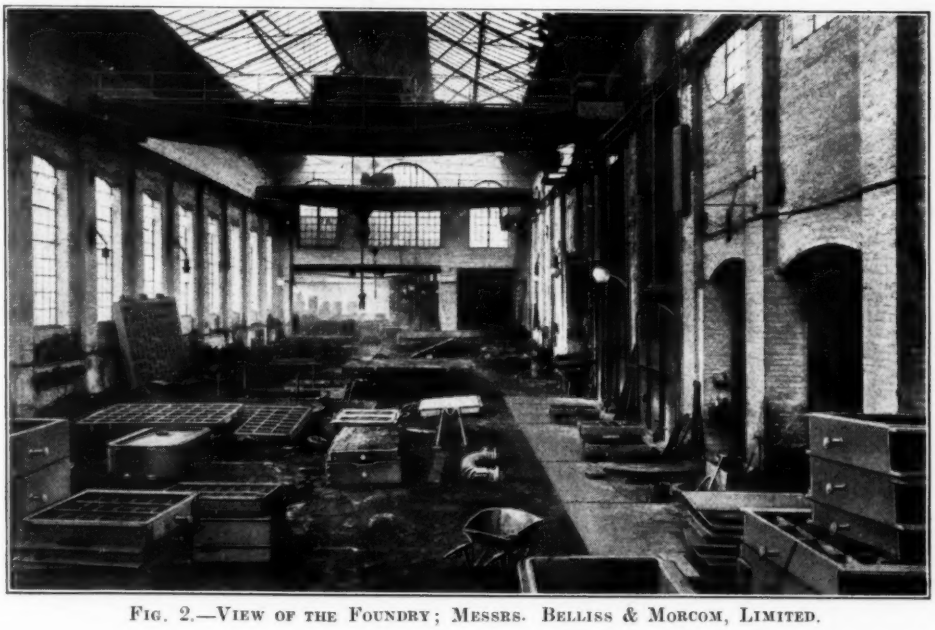


FIG. 2.—VIEW OF THE FOUNDRY; MESSRS. BELLISS & MORCOM, LIMITED.

ever, he designed a high-speed engine, the prototype of the present Belliss totally-enclosed, forced-lubricated quick-revolution engine, than which, we think it will be generally agreed, there is no better in the world to-day. The special features of Mr. Belliss' engine were its light weight for power, its high speed and the small space it occupied. It thus speedily came into favour for steam-launch propulsion, and when the Broad Street works were taxed beyond their capacity Mr. Belliss therefore transferred his activities to Ledsam Street, where the head offices of the present company are now situate, the shops being behind, entirely re-equipped and re-constructed and given over to the building of small engines and other auxiliary machinery.

Although from its inception the business had been steadily progressive, its abnormal development dates from 1884, when the late Mr. Alfred Morcom gave up a prominent position in the British Naval Service to become the partner of Mr. Belliss, and at the same time appointed Mr. A. C. Pain, who had been working under him at Portsmouth, chief draughtsman to the firm.

In view of the new personnel, it is not surprising that for some years developments were all in connection with the Navy. Engines were supplied for the smaller vessels of war, whilst torpedo boats, gunboats, etc., were engined from the Ledsam Street works. A considerable business was now called upon to build for lighting and power duties.

Extensive new works were therefore laid down in Icknield Square, which are known as the Electrical Machinery Department, and it is of these works which we propose to speak.

Situate in close proximity to the head office, the works are approached by a gateway entrance and bridge over the canal, coal and similar material being water-borne.

The Pattern Shop.

The pattern shop, housed in the top of a two-storey building, is 101 ft. by 75 ft. by 16 ft. high; it is remarkably well lighted and well ventilated. There is the usual complement of tools, including circular, band, finishing and other saws, fox cutters, planers, sand-papering machines, etc. There is also a small shop laid off for making and storing small patterns—cylinders, guides and the like.

The two lower floors are laid out for pattern storage, the patterns being carried on numbered and indexed racks.

The heavier patterns are stored in a bay parallel with the foundry, which is served by an eight-ton crane.

The Foundry.

Ample storage space is provided round the foundry. The sand is brought in by boat, and

FIG. 3.—LARGE MACHINE SHOP; MESSRS. BELLISS & MORCOM, LIMITED.

also carried out in dynamo engines for electric lighting on board ships of the Royal Navy.

At the time when electricity was coming into prominence for town lighting, it was generally assumed that the only engine capable of running at a high speed for prolonged periods was the single-acting constant-thrust type. Messrs. Belliss & Morcom, however, declined to bow to the orthodox, and offered their double-acting engine in all cases, with results which fully justified their confidence, for this engine more than held its own. It is, however, quite certain it would not have attained its present popularity as a prime mover but for the application of a system of forced lubrication which was designed and patented by Mr. A. C. Pain in 1890 and which, it is no exaggeration to say, completely revolutionised the possibilities of the double-acting, quick-revolution engine. The value of the innovation is evidenced by the fact that the system has been generally adopted by engine builders the world over.

No radical change has since been made in the design of the Belliss engine, though certain refinements of detail have from time to time been introduced as the outcome of the experimental work which is always in progress.

At the same time, the Belliss engine was not developed at the expense of other of the company's specialities. Condensers, air compressors, pumps and the like were developed along the same lines.

The business soon outgrew the Ledsam Street works, and, further, these works were not suitable for the large engines which the company were

transhipped by a 30-cwt. Telpher, which discharges into the bunkers in the sand shop. There are three sand mills (green, dry and loam moulds are made). All sand for re-use is passed over a magnetic separator. There is also an oil core-sand mixer by the Universal System of Machine Moulding, London.

The two foundries are devoted to the production of heavy and light castings respectively. The buildings are placed tandem, and communicate directly with each other, though for all practical purposes they are run as self-contained departments. For the heavy foundry, the metal is brought down in two cupolas of eight-tons and three-tons capacities respectively. The material is raised to the charging platform by a two-ton hoist. Blast is supplied by a Roots blower and Keith-Blackman fan, which are each driven by a 30 h.p. Laurence Scott motor, and are equal to blowing up to 20 ozs.

The foundry bay is 247 ft. long by 52 ft. 8 in. wide by 34 ft. 3 in. to eaves, and the floor is served by three cranes of 25-tons, 10-tons, and 5-tons capacities. There are three coke-fired drying-stoves, each approximately 20 ft. square and 14 ft. high. Naturally, the bulk of the moulding is done on the floor. A jolt-ramming machine is, however, in service, which will take boxes up to seven tons in weight, and has a 6-ft. square table. There are two tanks on the floor, which will take moulds for bedplates and casings for the largest engines.

The melting plant for the light foundry consists of two cupolas with respective melting capacities

of four tons and one ton per hour. The platform is served by a 30-cwt. hoist, and blast is supplied by a Roots blower, which is driven by a Bruce Peebles 30-h.p. motor. The light foundry is a bay 150 ft. long by 41 ft. wide by 24 ft. 6 in. high to the eaves, and the floor is served by cranes of 8- and 4-tons capacities. The two drying stoves are 14 ft. by 13 ft. and 10 ft. by 8 ft., each being 9 ft. high. The core shop, housed in an annexe, has a gas-fired drying stove. The machines include two Britannia jolt-rams and several hand machines.

line shafting and the heavier ones by independent motors. The tool-room, placed at one end of the shop, includes in its equipment a very complete range of gauges and jigs. Each gauge, before being issued, is checked on a Whitworth measuring machine, which is capable of recording up to 8 ft. There are, in addition, branch tool stores situate in the erecting shops and gallery, where gauges peculiar to the needs of each department can readily be obtained. In each store the check system of booking is employed. The two galleries

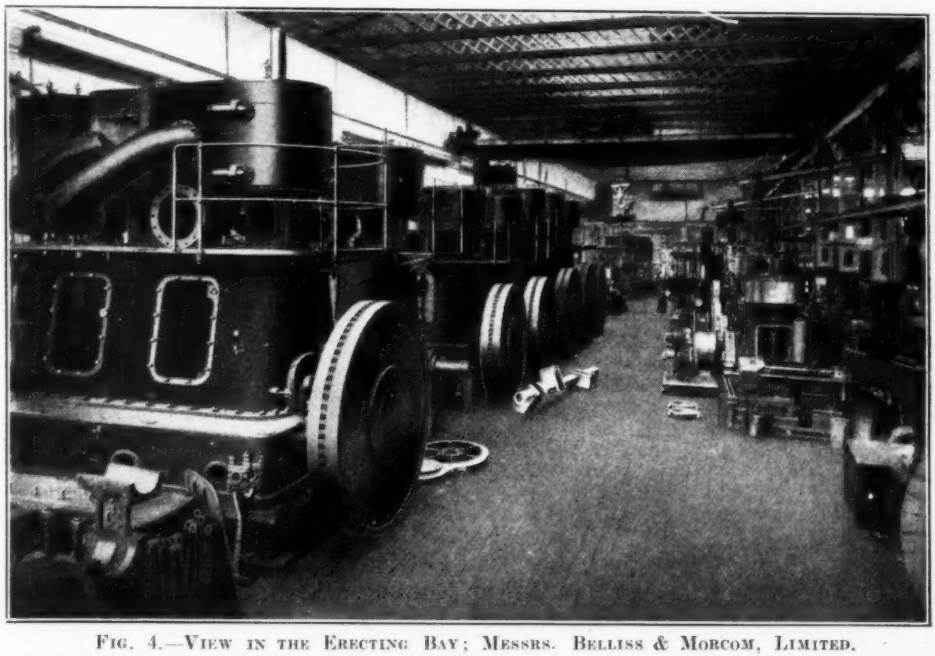


FIG. 4.—VIEW IN THE ERECTING BAY; MESSRS. BELLISS & MORCOM, LIMITED.

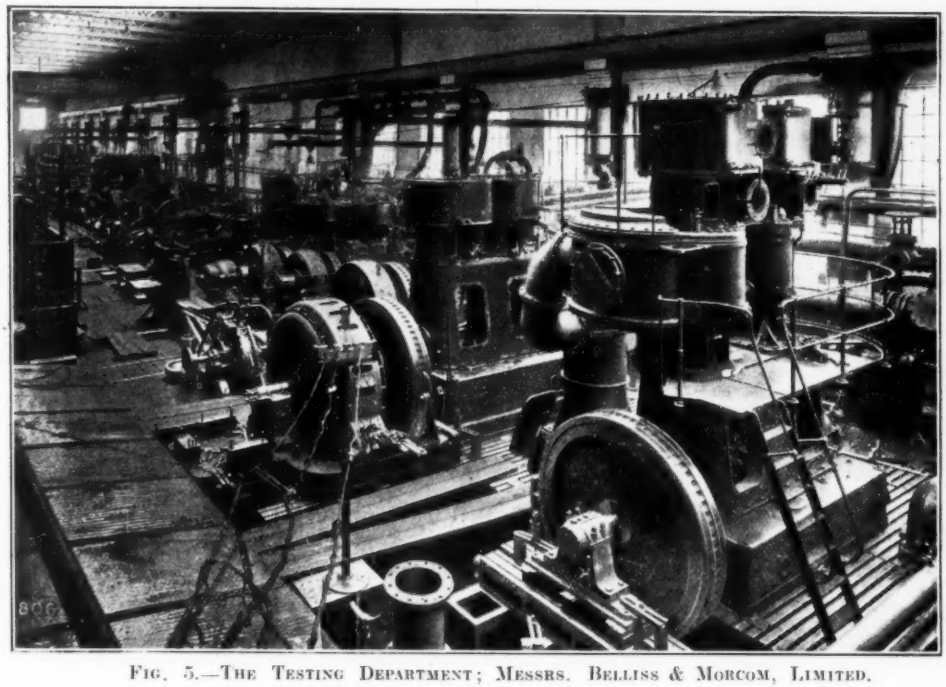


FIG. 5.—THE TESTING DEPARTMENT; MESSRS. BELLISS & MORCOM, LIMITED.

Both foundries are lighted with Mazda lamps installed by the B.T.-H. Company. Castings are turned out up to 25 tons in weight, and the weekly output is approximately 100 tons.

The Machine Shop.

From the foundry, a large gateway and set of rails leads into the main machine shop, which is divided into three bays 25 ft., 50 ft., and 25 ft. by 280 ft. In addition to five overhead cranes, there are a number of jib cranes, to facilitate handling work on the machines. The lighter tools are driven from

over the side bays of the machine shop are devoted respectively to small tools and cylinder fitting.

From the machine shop the work passes by way of a covered yard to the erecting shop, which is covered by two bays each 50 ft. span by 300 ft. The runways carry six cranes with lifting capacities up to 50 tons, so that engines up to 1,200 h.p. can be transported complete. Pits are provided in the shop for the erection of engines up to 2,500 h.p., and provision is also made for the erection of turbines of any commercial size.

The test plate is situate at one end of the shop, and here, within certain limits, all engines are tested before leaving the works.

Provision is made for testing condensing and non-condensing engines with steam pressures from 80 to 250 lbs. and degrees of superheat to 350 deg. Fah. above saturation point.

The voltage is anything from 60 to 6,000, with currents from 10 to 2,000 ampères, either in direct current or in single or polyphase alternating current of various frequencies. The boiler range is designed to supply eight berths, and is divided into two sections, each of which can be isolated with one or more boilers in case tests of different pressures are run simultaneously. The air pump discharge is passed into tanks attached to Avery balances, on which the amount of water delivered in any given interval is weighed and announced by an electric bell to a suitable point. A series of Heenan & Froude brakes is kept to suit various sizes

For tests of combined sets the load is taken up with water-resistance tanks and measured by means of a range of carefully-calibrated instruments.

The works generating station is replete with every modern refinement. The prime movers comprise reciprocating engines and turbines. The boilers are fitted with mechanical stokers controlled by a CO_2 recorder. Economisers are in service, and induced draught is employed. Steam is raised at 160 lbs. pressure and superheated to a temperature of 500 deg. Fah. Recording meters are employed and careful logs are kept so that the works costs can be accurately ascertained.

Trade Talk.

THE ballot taken of the men in the Mersey ship-repairing industry resulted in a two to one majority in favour of a return to work.

MR. W. FIRMIN, SEN., of W. Firmin & Son, Limited, brassfounders, of 142, St. Stephen's Road, London, E.3. died on May 29. in his eighty-fourth year.

JAMES PETRIE & COMPANY, 17, Oswald Street, Glasgow, have been appointed Scottish agents for Monks, Hall & Company, Limited, Atherton Quay, Warrington.

THE BUSINESS OF WM. GILPIN, SENR., & COMPANY, LIMITED, edge-tool and axle manufacturers, of Church Bridge Works, Cannock, has been acquired by Mr. J. P. Brockhouse.

DURING May the imports of foreign iron ore at the Senhouse dock at Maryport have been 18,000 tons, compared with 3,500 tons for April, and 3,500 tons at the corresponding period of last year.

MR. T. W. HOW, after 25 years' service as managing director and secretary of the Empire Roller Bearings Company, Limited, is shortly resigning that position in order to resume his general practice as a consulting engineer, and as an expert in roller and ball bearings, at 13, Victoria Street, Westminster, S.W.1

THE STEIN-CHAPMAN GAS PRODUCERS, LIMITED (a subsidiary company of Stein & Atkinson, Limited), have received an order for nine Chapman floating agitators from the Steel Company of Scotland, Limited, Blochairn Works, Glasgow. This order has been placed after the Steel Company of Scotland had one agitator installed for over eighteen months, during which period extensive tests have been carried out.

THE TURBINE FURNACE COMPANY, LIMITED, 238B, Gray's Inn Road, W.C.1, have secured numerous orders during the last two months for the installation of their patent furnace, those for the coal, iron and steel industries including W. Cooper & Goode, Limited; D. P. Battery Company, Limited; Hughes Stubbs Metal Company, Limited; Chorley Colliery Company, Limited; Moira Colliery Company, imited; R. Garrett & Sons, Limited; S. R. Anthracite Collieries, Limited; Leys Malleable Castings Company, Limited; and Chadburn's (Ship) Telegraph Company, Limited.

THE SUMMER MEETING of the Institution of Electrical Engineers opened in Glasgow on May 30, when the members assembled at the Royal Technical College under the presidency of Mr. J. S. Highfield. Lord Provost Paxton, in welcoming the members, said the Institution celebrated this year its 50th anniversary, and he thought it was fitting that in the year of their jubilee they should come to the city where Lord Kelvin—who in his time occupied their presidential chair—spent so many years of his long and useful life, and carried out the work which had made his name famous throughout the world.

AT the quarterly council meeting of the Cumberland and North Lancashire District of the National Federation of Blast-furnacemen, the secretary reported that a new wage settlement had been arrived at in the Cleveland district, which was looked upon as a stable one, and it was decided to congratulate the Cleveland district secretary. The meeting also congratulated the general secretary on the fight he had put up to the employers for the retention of the week-end overtime payment. The general secretary also gave a report on the wages position in the Cumberland and North Lancashire district, and explained that a new arrangement would have to be arrived at, because the temporary arrangement for the regulation of wages would end with the commencement of the second full pay-day in July next. It was agreed to empower the Wages Negotiation Committee to make a new arrangement with the employers.

Correspondence.

[We accept no responsibility for the statements made or the opinions expressed by our correspondents.]

Birmingham Conference.

To the Editor of THE FOUNDRY TRADE JOURNAL.

SIR,—May I express my regret that Mr. Vickers (Conference Secretary) has deemed it necessary to close the lists to late applicants who desire to attend some of the functions taking place at Birmingham during the next fortnight?

While I know that these things are extremely difficult to organise, "etc.," I would express the view that it would have been preferable to have left matters a little more open, to enable those who cannot, by force of circumstances, fix upon definite dates weeks ahead, a little more chance of availing themselves of opportunities to join in some of the affairs at Birmingham.

There must be numbers of members of the I.B.F. who, like myself, would have given early decisions upon these matters had they been able, but owing to circumstances, financial and otherwise, have not been able to, and therefore find themselves "outside the pale."

It is not always the horrible apathy of those connected with foundry work that dictates their actions, and it is regrettable that this point was not given a little more consideration.

I note Mr. Vickers' letter is dated June 3. This means that the lists were closed approximately three weeks before the Conference, and can only express surprise at the rigidity of the decision so soon before the Conference.

I would point out that the older institutions, to which Mr. Vickers makes reference, almost invariably state that after the closing date, "tickets will not be guaranteed"—a very different matter.

I shall be at the Conference, but cannot say that I shall feel too pleased at being precluded from joining with some of my fellow-members on various occasions.—Yours etc.,

"COMPLAINT,"
Member of London Branch.

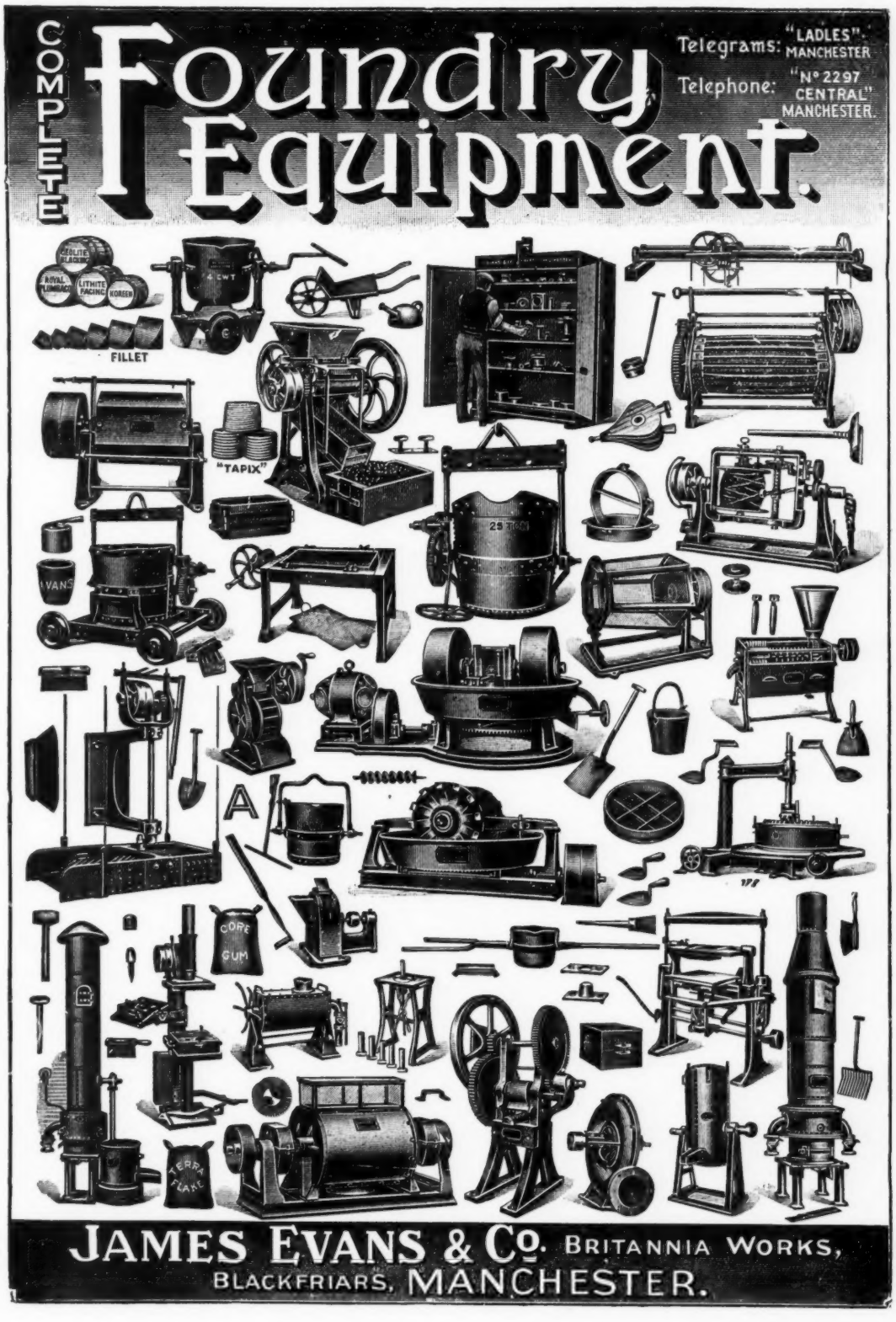
Handling Repeat Jobs.

To the Editor of THE FOUNDRY TRADE JOURNAL.

SIR,—In reply to "Inquirer," I regret to say that I find it necessary to qualify the statement which I made, and to which he refers, on the question of hand-rammed snap flash work. The practice to which I made reference was carried on, within my own knowledge, up to about three years ago, and, in all probability, is still being done in the same foundry. On looking up some notes, however, I find that the man making the rheostat grids had the assistance of a boy of about seventeen years of age, who rammed up the top halves of the moulds. The man himself carried his metal from the furnace, in a hand-ladle, whilst the boy moved the weights.

After completion of the day's cast, the man pulled his castings out of the sand and placed them in a heap. During the night the sand was mixed by a labourer and thrown into a convenient heap. Any riddling required was done by the moulder himself.—Yours, etc., J. LONGDEN.

30, Binden-road, London, W. 12,
May 7, 1922.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IRON AND STEEL MARKETS.

Pig-iron.

The more promising outlook of an early resumption of work in the engineering industry has so far had practically no effect in stimulating activity in pig-iron markets, which, during the week just closed, have shown little improvement on the conditions previously reported. In the Midlands, however, there is in evidence a confident anticipation of better times approaching, and at last week's Birmingham meeting this view was to some extent justified by some increase in the volume of inquiries for foundry pig, for which quotations were firm at recent prices. Forge qualities, on the other hand, continue in poor demand, due, it is suggested, to the limited output of finished material, most of the works having been closed down for an extended holiday, with depleted order books as the rule. On the North-East Coast it is hoped that the more favourable turn of events in the labour position will influence a return of activity in the Cleveland iron market, especially as concerns home consumption, which of late has been reduced to almost a minimum.

In the East Coast hematite market there is practically nothing doing at present, but with the industrial outlook clearer it should be possible more accurately to gauge the position. The tendency just now is certainly weaker. East Coast mixed numbers are quoted at 95s., but it is possible to shade this figure, and even the premium of 1s. for No. 1 is partially waived in some instances. Foreign inquiry remains placid, and home business is still very quiet.

Finished Iron.

It is, of course, as yet too early to estimate the probable effects of an impending settlement of the engineering dispute on the prospects of the finished iron trade, but at Birmingham last week a more confident tone was in evidence that the corner has been turned, and that the future outlook will show a marked improvement in demand. A further reduction in ironworkers' wages, following the recent ascertainment, is also an encouraging factor in the position, and if an additional substantial decrease in rail transport charges can be effected manufacturers of finished material may experience a welcome revival of demand in the near future. The conditions thus outlined must also largely affect the foundry industry, which for some months past has been badly off for orders, especially castings required in the engineering branches.

Scrap.

Conditions in the iron and steel scrap trade continues variable, some markets still remaining almost stagnant, while others, including South Wales and Scotland, show signs of revived vitality. At Sheffield, for example, some heavy steel is being bought for outside districts at a fractional improvement in price, but for local consumption there is scarcely anything doing. A little demand for old rails is reported, and this material for re-rolling now fetches up to 80s. per ton. Foundry scrap stands at from 80s. to 90s. per ton, but there is very little inquiry. At Middlesbrough the following are nominal prices, all delivered works:—Heavy steel melting scrap, 62s. to 62s. 6d.; cast-iron machinery scrap, 80s.; ordinary heavy cast iron, 75s.; steel turnings, 45s.; cast-iron borings, 45s.; heavy wrought-iron piling scrap, 62s. 6d.; ditto, bushelling scrap, 62s. 6d.; heavy forge iron, 67s. 6d. to 70s. per ton.

Steel.

Restarting work after the holidays in the steel trade has been a somewhat slow process, and apart from a few branches having orders in hand there will be no general resumption of activity until labour conditions become more settled. In Sheffield and district, while buying is still on a restricted scale, there is a fairly confident undertone, and with the termination of the trouble in the engineering branches the consensus of opinion in steel trade circles is that favourable market movements may be expected shortly. Plates, angles and sections have been reduced 10s. per ton.

Metals.

Copper.—Messrs. Henry Bath & Company, Limited, in their latest metal report state:—Recently the market for standard tin has experienced an almost unbroken sequence of advancing prices, the total gain on the fortnight amounting to nearly £3 a ton. The demand for rough copper has continued, and some good buying of refined is reported. The stocks in this country of the latter quality have fallen to a very low figure. Strong reports continue to be received from America, where a persistent demand is being experienced both for home consumption and for export, and sales this month are expected to show a large increase over April. The output of the American refineries is gradually increasing, but it will be many weeks before any material effect is felt, by which time consumption, which is steadily improving, will require a greater production to fill its requirements. Closing prices.—*Cash*: Wednesday, £62 17s. 6d.; Thursday, £62 7s. 6d.; Friday, £62; Monday, £61 7s. 6d.; Tuesday, £61. *Three months*: Wednesday, £63 5s.; Thursday, £62 15s.; Friday, £62 7s. 6d.; Monday, £61 12s. 6d.; Tuesday, £61 7s. 6d.

Tin.—The home demand for standard tin does not appear to have improved, and advices from America do not record any material increase in consumption recently. Estimates point to unusually heavy shipments during May from the East, 7,000 tons being spoken of as possible. In any case, a fairly large increase in the visible supply is foreshadowed, although it may be largely brought about by a transfer from invisible to visible supplies. The demand for tin ores continues unabated, and good prices are being realised for any parcels available. The visible supply on April 30, according to the Metal Exchange statistics, amounted to 23,917 tons, against 23,158 tons on March 31, an increase for the month of 759 tons. Closing prices:—*Cash*: Wednesday, £154 7s. 6d.; Thursday, £153 7s. 6d.; Friday, £153; Monday, £151 15s.; Tuesday, £150 5s. *Three months*: Wednesday, £155 10s.; Thursday, £154 10s.; Friday, £154 5s.; Monday, £153 2s. 6d.; Tuesday, £151 10s.

Spelter.—Business in the market for spelter has been well maintained of late, some active buying having been transacted on account of the consuming industries. Uncertainty as regards future supplies has influenced some stiffening of prices. Closing prices.—*Ordinary brands*: Wednesday, £28 5s.; Thursday, £28 5s.; Friday, £28 5s.; Monday, £28 5s.; Tuesday, £28.

Lead.—Recent movements in the market for soft foreign pig have developed a tendency to advance prices, and with a fair demand from home consumers business on the whole has been satisfactory in volume. English lead continues steady. *English closing prices*: Wednesday, £26 5s.; Thursday, £26 5s.; Friday, £26 5s.; Monday, £26; Tuesday, £26.

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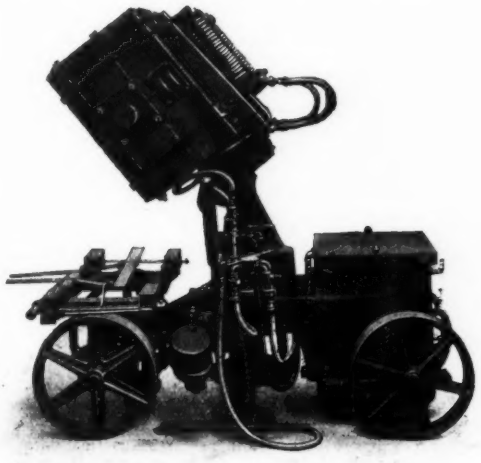

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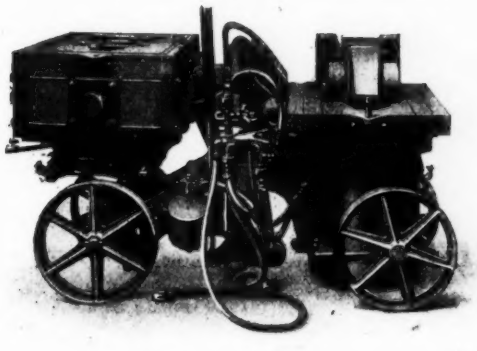

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Company News.

Silco, Limited.—Capital £500. Iron cement manufacturers. Directors: L. J. Tibbenham and R. W. Lewin.

Lees Engineering Company (Halifax), Limited.—Capital £1,000. Directors: Mrs. E. A. Lees and E. Ogden.

H. & C. Grayson, Limited.—Balance carried forward, £9,747; interim dividend, 6d. per share, paid on deferred shares in April, 1921.

Guest, Keen & Nettlefolds, Limited.—Final ordinary dividend, 6d. per share, free of tax, making 10 per cent. per annum for nine months to March 31, free of tax.

H. D. Butler & Company, Limited.—Capital £2,500 in £1 shares. Engineers. Directors: H. D. Butler and G. A. Huxley. Registered office: 15, Queen Street, Cheapside, E.C.

Moonbeam Engineering Company, Limited.—Capital £12,250 in £1 shares. Directors: D. J. Ritchie, A. Garrard, and W. E. Dommett. Registered office: 49, Queen Victoria Street, E.C.

Eckhout & Company, Limited.—Capital £30,000 in £1 shares. Iron dealers. Directors: A. A. Eckhout, J. M. Dewar, and A. W. Eckhout. Registered office: 82, Gordon Street, Glasgow.

Hayward Turbine Engineering Company, Limited.—Capital £100 in 1s. shares. Permanent governing director: I. B. Blaiberg. Registered office: Liberty Works, Bollo Lane, Acton, W.3.

Charles J. Fox, Limited.—Capital £10,000 in £1 shares. Iron, steel, and metal merchants. Secretary: C. R. Stanmore. Registered office: 2, Maryland Point, Stratford, London, E.15.

Robert Unsworth & Company, Limited. — Capital £2,000 in £1 shares. Engineers. Directors: R. Unsworth, E. Unsworth, A. Unsworth, and H. Heap. Registered office: Post Office Chambers, Colwyn Bay.

L. McMichael, Limited.—Capital £10,000. Wireless engineers and contractors. Permanent directors: H. L. McMichael, R. H. Klein, and A. G. Bloch. Registered office: Providence Place, West End Lane, Kilburn, N.W.

Ruston & Hornsby, Limited.—Profits, £101,638; depreciation, £55,952; debenture interest, £25,000; net profits, £20,185; brought forward, £43,920; preference dividend paid to July 1, 1921; balance, £58,231, carried forward; £100,900 transferred from reserve in order to meet possible fall in values of stock-in-trade.

Henry Gardner & Company, Limited.—Available, after providing for loss last year, and giving credit for excess profits duty recovered, £41,469; final dividend, 7 per cent. per annum for half-year; carry forward, £11,469.

The North British Diesel Engine Works (1922), Limited.—Capital £500,000 in £1 shares, to acquire the business of the North British Diesel Engine Works, Limited. Directors: T. E. Thirlaway, N. E. Peck, and C. R. Smith. Registered office: North British Diesel Engine Works, Whiteinch, Glasgow.

Gazette.

MESSRS. J. H. BAILEY and M. A. Hardyman, engineers, 25, Old Dover Road, Blackheath, trading under the style of Hardyman's Scientific Engineering Company, have dissolved partnership.

THE partnership heretofore subsisting between Messrs. T. Sturge, F. Jones, E. Sturge, and A. Sturge, screw makers, Soho Street, Oldham, under the style of William Sturge, has been dissolved.

THE partnership carried on by W. G. Dixon and W. T. Garton, under the style of Campbell & Son, of Mawdsley Chambers, 17, Mawdsley Street, Bolton, mining engineers, etc., has been dissolved. Mr. W. G. Dixon will continue the business under the same style.

MESSRS. R. TROTTER, J. MUIR, A. H. DODGSON, W. DODGSON, G. W. TROTTER, AND F. W. AINSLIE, trading at 3, Albert Terrace, and at the Foundry and Pattern Shop, Oxford Street, West Hartlepool, under the style of the Homogeneous Metal Process Company, have dissolved partnership.

W. H. PEASE & COMPANY, LIMITED, of Hastings House, Norfolk Street, Strand, W.C.2, have just completed an arrangement to act with Hughes, Bolckow & Company, Limited, shipbreakers, etc., and Messrs. L. Aldridge & R. T. Hughes, who recently purchased the extensive dumps of new and used surplus war material in France and Belgium. The firm have now taken over a site of five acres of land alongside one of the main lines to the North within easy reach of London. When this depôt has been opened it will be possible to inspect many of the items available in bulk at the depôts in France.

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